

FINAL

Market Research Report
Electrokinetic Demonstration

at

Naval Air Weapons Station
Point Mugu, California

Task Order Number: 5

Contract No. DAA-93-D-0009

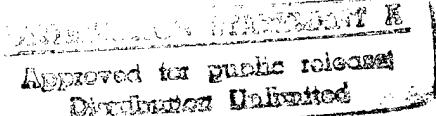
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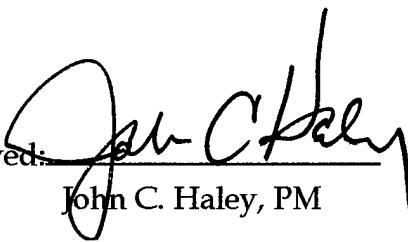
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Date: 7-23-97



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13. ABSTRACT (Maximum 200 words) This market research report describes the methods used for identification, evaluation, and selection of a vendor to perform an Electrokinetic (EK) technology demonstration at Naval Air Weapons Station (NAWS) Point Mugu. The identification phase involved the use of a variety of data sources listing potential vendors who are currently involved in EK technology and capable of performing the technology demonstration. The evaluation phase of the research focused determining the ability of the vendors to sustain a demonstration both technologically and financially. From the evaluation phase five vendors were chosen to participate in the selection phase of the research. Each potential vendor was given instructions and site data to prepare for the presentation of oral briefs to a panel of technical professionals. From the oral briefs, one vendor was selected to participate in the technology demonstration at NAWS Point Mugu. Throughout the market research, an objective and precise protocol was followed to ensure that no one company was favored or excluded in the selection process.			
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1.0 INTRODUCTION

The US Army Environmental Center (USAEC) will conduct a technology demonstration of electrokinetics on heavy metals-contaminated soils. The demonstration is sponsored by the Environmental Security Technology Certification Program (ESTCP) and the Southwest Division, Naval Facilities Engineering Command (NAVFAC SOUTHWEST DIV). The demonstration will be conducted at the Naval Air Weapons Station (NAWS), Point Mugu, California, at Site 5 - Old Area 6 Shops.

As part of the work to be performed under the technology demonstration, LB&M Associates, Inc. (LB&M) is under contract with the US Army Environmental Center (USAEC) to select a vendor to perform the demonstration. LB&M designed a three step process to select the vendor who will conduct the demonstration. The selection process was balanced and objective and designed to select a vendor capable of successfully completing the demonstration. In the first phase LB&M conducted a market search to identify those companies who are capable of installing an electrokinetic system. The next step involved obtaining additional information on the company, its experience, and technical capabilities. The information received was used to select five companies who were requested to submit a bid to execute the demonstration. The final step involved the evaluation of the written and oral presentations submitted and the selection of the company to perform the demonstration.

2.0 SELECTION OVERVIEW

LB&M compiled a list of companies involved in electrokinetics technology, evaluated the companies based on their technology and business history, and selected one vendor to perform the demonstration. All information submitted to LB&M was considered confidential and stored in a locked file cabinet at LB&M Associates, Inc., Lawton, Oklahoma. Each vendor's information package was individually enclosed in a portfolio file and clearly marked with the company name and point of contact. The outside of the package was clearly posted with the persons whom had access to the information inside the package. (Appendix A).

2.1 Step 1: Research and Identification

A source list was developed using the following resources:

1. the US Environmental Protection Agency's *Vendor Information System for Innovative Treatment Technologies* (VISITT) program which lists current energy and remedial technologies and the associated vendors;
2. a Commerce Business Daily (CBD) advertisement (Appendix B);
3. the Internet; and

4. data provided by the USAEC and U.S. Army Corps of Engineers Waterways Experiment Station (USACEWES).

2.1.1 Vendor Contacts

A total of twelve potential vendors were identified. Each vendor was initially interviewed by telephone to determine their current technological ability and availability. Table 1 is a complete list of the vendors that were identified in the vendor search and information about the contact source and contact medium.

Table 1: Vendor Search Summary

<i>Contact Source</i>	<i>Company</i>	<i>Point of Contact</i>	<i>Contact Medium</i>
CBD OTHER ^a			
✓	Compliance Consultants, Inc.	Dr. Robert Marks Development Director	Phone/Letter
✓	CORRPRO, Inc.	George Gehring Executive Vice President	Phone/Letter
✓	Electrokinetics, Inc.	Elif Ozsu-Akar President	Phone/Letter
✓	Electro-Petroleum, Inc.	Dr. Kenneth Wittle Vice President	Phone/Letter
✓ ✓	Fluor Daniel GTI	Richard Horne Project Manager	Phone/Letter
✓	HAZRAP ^b	Rick Horne Project Manager	Phone/Letter
✓	ISOTRON	Henry Lomansey President	Phone/Letter
✓	Lockheed Martin-California	Dr. George Lowe/ Steven Swartzkopf	Phone/Letter
✓	Lockheed Martin-New Mexico ^c	Lonnie Byers Program Development	Phone/Letter
✓	LYNNTECH, Inc.	Dalibor Hodko Principal Investigator	Phone/Letter
✓	Mantech	Robert Steele Marketing Director	Phone/Letter
✓	Sat-Unsat.	Earl Mattson Principal Hydrologist	Phone/Letter

Footnotes:

a: EPA VISITT Database, Internet, USAEC & USACEWES-supplied

b: A subsidiary of Lockheed Martin

c: In association with Sandia National Laboratories

2.2 Step 2: Vendor Qualifications

Following the initial telephone interview, an introductory letter was sent requesting general information about the company's history, technology background, and a point of contact (Appendix C).

A second letter was sent to all of the identified vendors outlining specific information about the vendor's company and technology history (Appendix D). Contained within the vendor package was a nondisclosure agreement executed between LB&M and the specified vendor (Appendix E). An attachment was sent with the letter outlining the information needed for the evaluation (Appendix F). The following categories were the focus of the requested information:

- Technology/Methodology
- Scientific Background
- General Company History/Background
- Cost Analysis/Cost History of Technology

Each of the principal groups was further subdivided into categories that detailed advantages and disadvantages of the technology and the offeror. The specific description of the elements of each group is presented in Appendix F.

Due to an error, some companies were sent mis-addressed nondisclosure agreements. The vendors were asked to discard the documents. New agreements were sent and companies were asked to return to LB&M the two signed and addressed agreements. One original signed by authorized persons at LB&M was returned to the vendors for their records.

In response to the information request letters, some of the potential vendors were retired from the vendor list or chose not to participate in the technology demonstration. A list of these vendors and the reason they did not participate is as follows:

- ***HAZRAP***
 - Reason Not Given
- ***Lockheed Martin, California***
 - Duplicate facilities of Lockheed Martin - Laboratory of Lockheed Martin in Albuquerque, NM
- ***Mantech***
 - Patent and technology-privacy issues
- ***Sat-Unsat***
 - Not a technology company-laboratory

2.2.1 Vendor Scoring

Using the Borland® Visual dBase® database, Version 5.5, the submitted data was manually entered or electronically transferred from 3.5" diskette, into the database by LB&M technical personnel. The data was reviewed and scanned for accuracy against the vendor submitted data packages. The information was then rated on a criteria table used for the scoring (Appendix G). Five LB&M technical specialists independently reviewed and scored the data from each category as submitted by the vendor. The technical specialists

included two persons not directly associated with the review process and three who had been involved. Summary information about the technical specialists is presented in Table 2.

Table 2: Technical Specialists Summary Information

<i>Specialist Identity</i>	<i>Area of Expertise</i>	<i>Scorer Number</i>	<i>Approximate Length of Involvement in Selection Process₁</i>
Ronald H. Gore, Ph.D.	Chemistry	2	N
Paula S. Homan, B.S.	Geology	3	N
Tina L. Neal, B.S.	Fire Protection and Safety Engineering	1	M
Barbara N. O'Keeffe, M.Sc.	Chemistry	5	M
Martin A. Wills, M.Sc.	Geology	4	F

Legend

1: F = Full Involvement from the Beginning; (M) Moderate or Ancillary Involvement; (N) Minimal or No Involvement.

All scores were tabulated and plotted and are summarized in Table 3 and Figure 1.

Table 3: Vendor Selection Summary Scores

<i>Company Name</i>	<i>Scorer 1</i>	<i>Scorer 2</i>	<i>Scorer 3</i>	<i>Scorer 4</i>	<i>Scorer 5</i>	<i>Average</i>	<i>Rating</i>
Compliance Consultants, Inc.	87	82	84	90	83	85	1
CORRPRO Companies	81	82	81	88	86	84	2
Electrokinetics, Inc.	75	79	84	80	86	81	3
Electro-Petroleum, Inc.	71	71	71	74	61	70	6
Fluor Daniel GTI	62	83	78	74	72	74	5
ISOTRON	31	55	37	46	30	40	8
Lockheed Martin Corporation	54	67	60	70	67	64	7
LYNNTECH, Inc.	72	76	73	83	80	77	4

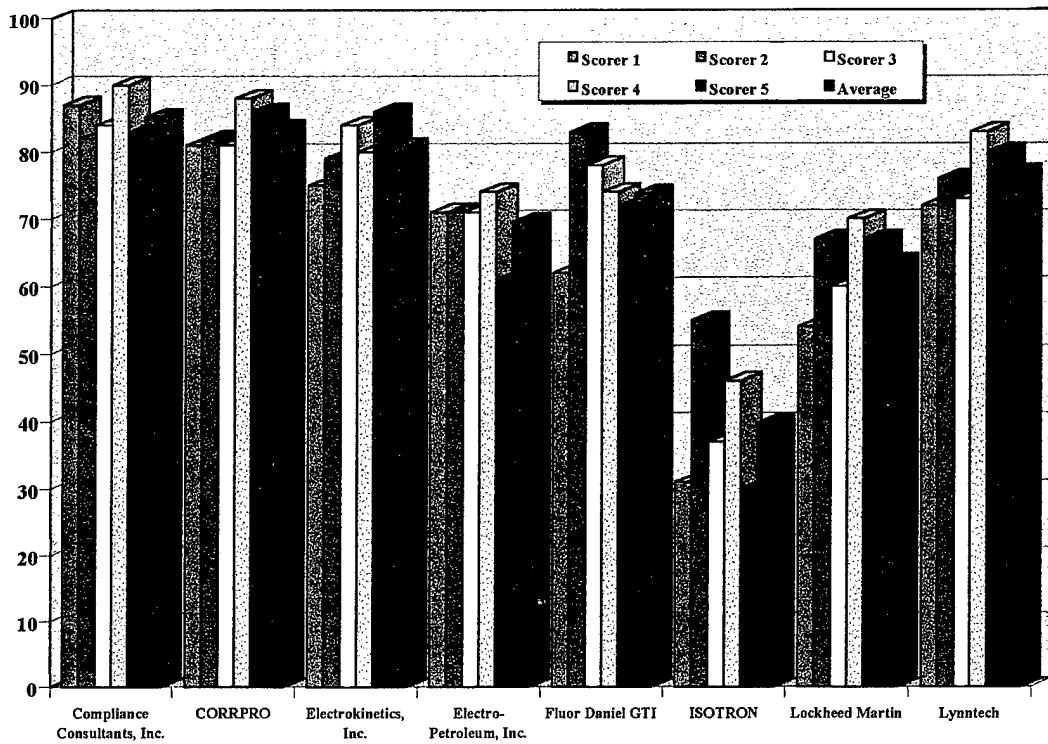


Figure 1: Composite Plot of Scores and Averages in Vendor Selection

Low scores seen in Figure 1 resulted from vendors submitting either insufficient or deficient information during the evaluation stage. As stated in the vendor selection criteria attachment (Appendix F), “unmarked diamonds will be considered deficient and treated as such. For LB&M to properly and objectively evaluate potential vendors, all of the requested information must be submitted.” Therefore, categories with little or no information were scored down accordingly.

2.3 Step 3: Vendor Selection

From Table 2 and Figure 1, it is clear that all scorers rated the companies similarly and the goal of objectivity was attained. From the scores, the top five vendors selected to prepare oral and written presentations were:

- Compliance Consultants, Inc.
- CORRPRO Companies
- Electrokinetics, Inc.
- Fluor Daniel GTI
- LYNNTech, Inc.

2.3.1 Vendor Information Package

Vendors who were selected to participate in the oral presentations were initially contacted by phone to facilitate the preparation of the presentations. Letters were then sent to the vendors to document the selection (Appendix H).

A vendor information package was sent to each of the five selected vendors outlining the format for the oral and written presentations (Appendix I). Additionally, the vendors were sent a draft report summarizing electrokinetic treatability studies performed at the of the US Army Corps of Engineers Waterways Experiment Station, Vicksburg, Mississippi, to assist them in the production of their written and oral presentations. Two of the potential vendors decided not to submit written presentations and participate in the oral presentations for the following reasons:

- *CORRPRO Companies*
 - The company concluded that the technology for the removal of trivalent chromium is not ready for deployment at the Point Mugu sites. "Further, based on the data presented in the WES report, it appears that premature application of this technology might well extend the region of contamination by mobilizing the pollutants without removing them." The full letter from CORRPRO is presented in Appendix J.
- *Fluor Daniel GTI*
 - Claimed through their partnership with Geokinetics International, Inc., that the electrokinetics technology is patented by Geokinetics and use of the technology is an infringement of their patent rights - U.S. patents 5,589,056 and 5,433,829 -collectively known as the "pool process". The full letters from Fluor Daniel and Geokinetics is presented in Appendix K.

2.3.2 Vendor Scoring and Oral Presentations

During the week of 7 April 1997, oral briefs were presented to a panel of five technical specialists at the Lawton, Oklahoma office of LB&M Associates, Inc. The panel consisted of three LB&M employees, one USAEC employee, and one employee from USACEWES; only LB&M personnel were involved in scoring and selection of the vendor. The identity of the panel members is presented in Table 4.

Scoring sheets used by the three LB&M scorers are presented in Appendix L. The selection of the vendor was based on the following information:

1. Written Proposals;
2. Oral Presentations; and
3. Cost Proposals

Table 4: Panel Member Information

PANEL MEMBER IDENTITY	POSITION	ORGANIZATION
Dr. Ronald H. Gore	Senior Chemist	LB&M Associates, Inc.
John C. Haley	Program Manager	LB&M Associates, Inc.
Dr. Boyd T. Riley	Senior Engineer	LB&M Associates, Inc.
Gene L. Fabian	Project Manager	US Army Environmental Center
R. Mark Bricka	Electrochemist	US Army Corps of Engineers Waterways Experiment Station

Table 5 and Figure 2 are summaries of the scoring by the three LB&M panel members.

Table 5: Summary of Panel Scores

Panel Member	Compliance Consultants, Inc.	Electrokinetics, Inc.	Lynntech, Inc.	Total Score Available
Ronald Gore	209	232	251	300
John Haley	117	181	201	
Boyd Riley	160	180	254	
AVERAGE	162	198	235	

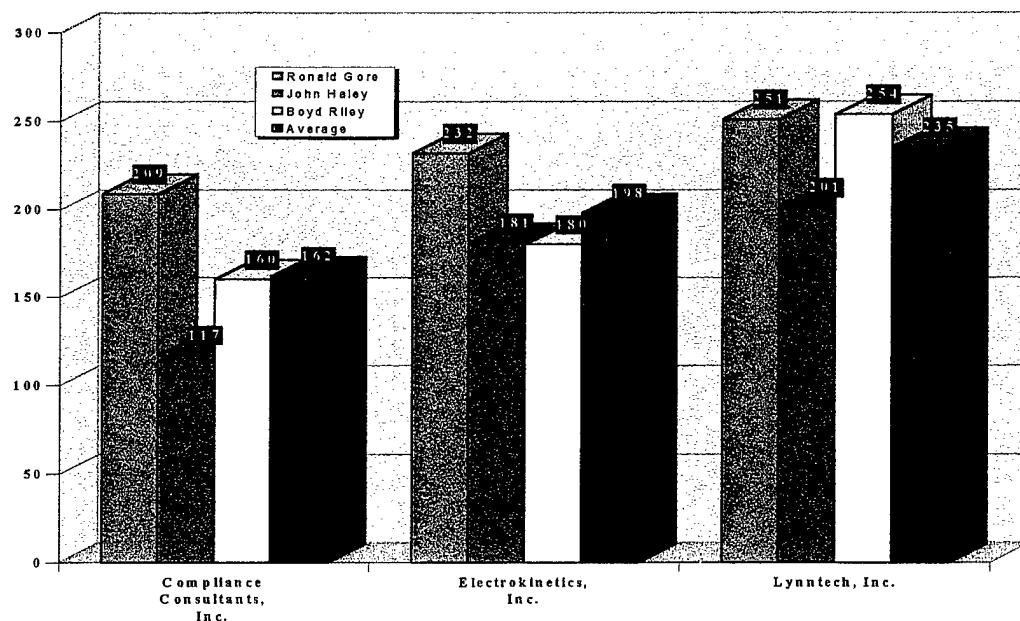


Figure 2: Summary Chart of Scoring for Vendor Oral Briefs

The vendor selected by LB&M to perform the technology demonstration at NAWS Point Mugu is:

LYNNTECH, Inc.

Mr. Thomas Rogers, Senior Scientist
7610 Eastmark Drive, Suite 105
College Station, TX 77840

Specific areas which lead to the selection were LYNNTech's:

- engineering approach to the demonstration;
- electrokinetic demonstration at Elgin Air Force Base with sand media; and
- experience with chromium removal in Texas.

Appendix A : VENDOR FILE COVER SHEET

VENDOR NAME

**THE CONTENTS OF THIS FOLDER
ARE NOT TO BE DISCUSSED
WITH ANYONE BUT THE
FOLLOWING PERSONNEL:**

1. **POINT OF CONTACT:** VENDOR NAME
2. **GENE FABIAN** - US ARMY
ENVIRONMENTAL CENTER (USAEC)
3. **MARK BRICKA** - US ARMY CORPS OF
ENGINEERS WATERWAYS EXPERIMENT
STATION (USACEWES)
4. **LB&M ASSOCIATES, INC. EMPLOYEES:**
 - JOHN HALEY
 - RONALD GORE
 - MARTIN WILLS
 - BARBARA O'KEEFFE
 - RHONDA MOON
 - AARON FOSTER
 - TINA NEAL

Appendix B : COMMERCE BUSINESS DAILY ADVERTISEMENT

Sources Sought. The Army Environmental Center (AEC) is seeking companies experienced and capable of performing electrokinetic remediation. AEC intends to select a company to participate in a demonstration project at Naval Air Weapons Station (NAWS) Point Mugu, CA. Information provided should include, basic approach description, project experience, and a point of contact. Replies should contain no proprietary information and should be submitted to: LB&M Associates, (Attn: Mr. M. Wills), 211 SW "A" Ave., Lawton, OK 73501. This is a sources sought announcement only and not a request for proposal.

Appendix C : FIRST CONTACT LETTER

Point of Contact
Vendor Name
Address
City, State, ZIP Code

Dear Mr./Ms. Point of Contact:

Thank-you for taking the time to speak with me concerning your company's interest in the upcoming Electrokinetic demonstration. As we discussed, the US Army Environmental Center (USAEC) is seeking companies experienced and capable of performing electrokinetic remediation of heavy metals in groundwater and natural sediment. Please include in your submittal the following information: basic scientific approach, project experience, scale of success (i.e. bench, pilot, site), and a point of contact within your company. **Replies should contain no proprietary information.**

This is a sources sought announcement only and not a request for proposal. Thank you for your cooperation.

Sincerely,

Martin A. Wills
Project Geologist

Appendix D : SECOND CONTACT LETTER

17 December 1996

Electrokinetics Technology Provider
ATTN: Point of Contact
Mailing Address
City, State ZIP

Dear Mr./Ms. Point of Contact:

Thank you for providing some basic information on your electrokinetics technology process for possible use in a technology demonstration. In order to more completely evaluate your system, we ask that you provide details and appropriate supporting information by 15 January 1997. LB&M appreciates your cooperation in providing the additional information regardless of any apparent redundancy.

We have included a subject matter guide and we ask that you use it to structure your reply. Please submit your replies in hardcopy and on a 3.5" floppy disk in DOS WordPerfect 5.0 or Microsoft Word 5.0 or later versions.

In order to protect your proprietary interest, LB&M will execute the enclosed nondisclosure agreement with you prior to submission of sensitive material. Two nondisclosure agreements are enclosed. Please sign both and return them with your company's information. One original signed by authorized persons at LB&M will be returned for your records. This sensitive material will be made available only to the US Army Environmental Center (USAEC) and persons directly associated with the selection decision. ***Please clearly mark all items which your company considers proprietary.***

The selection process has been divided into three levels: 1) vendor identification and initial contact; 2) request for additional information (the present phase); and 3) selection of vendors. The information collected in the present phase will be used to evaluate and rank the technical abilities of the offerors. The highest ranking offerors will be given the opportunity to present oral briefs outlining their company's ability to perform the demonstration. Vendors selected by the USAEC to participate in the oral presentations will be provided necessary site information and will be asked to submit bids. When funds are available, LB&M will award a subcontract

based on the offerors technical abilities and cost. The oral briefs will be made to USAEC and LB&M representatives at the Lawton office of LB&M Associates, Inc.

If you have any questions, please contact me or Mr. Jack Haley.

Most sincerely,

Martin A. Wills
Project Geologist

Appendix E : NON-DISCLOSURE AGREEMENT

Agreement made this _____ day of _____, 1996, by and between LB&M
Associates, having an office and place of business at 211 SW A Avenue, Lawton,
Oklahoma 73501 (hereinafter referred to as "LB&M"), _____
having an office and place of business at _____

(hereinafter
referred to as "_____").

WITNESSETH:

WHEREAS, the parties desire to engage in discussions relating to

WHEREAS, such discussions may involve the disclosure or exchange of
information which the disclosing party considers to be proprietary or competitively
sensitive ; and

WHEREAS, the parties wish to define their rights and obligations with respect to
such information.

NOW THEREFORE

In the consideration of the foregoing and the mutual promises herein exchanged,
the parties agree as follows:

1. The exclusive points of contact with respect to the transmission and control of
information exchanged hereunder are designated by the respective parties as follows:

LB&M Associates, Inc.
211 SW A Avenue
Lawton, Oklahoma 73501
ATTN: _____

Vendor
Address
City, State, ZIP Code
ATTN: Point of Contact

Each party may change its designation by written notice to the other parties.

2. Proprietary information includes, but is not limited to, performance, sales, financial, contractual and special marketing information, ideas, technical data and concepts originated by the disclosing party, not previously published or otherwise disclosed to the general public, not previously available to the receiving party or others without restriction, nor normally furnished to others without compensation, and which the disclosing party desires to protect against unrestricted disclosure or competitive use, and which is furnished pursuant to this Agreement and appropriately identified as being proprietary when furnished.

3. Any information exchanged by the parties and entitled to protection hereunder shall be identified as such by (i) appropriate stamp or markings on the document exchanged, or (ii) written notice with attached listing of all material, copies of all documents and complete written summaries of all oral or visual disclosures (under prior assertion of proprietorship) to which each notice relates, delivered within two (2) weeks of the disclosure to the persons designated in or in accordance with Paragraph 1., above.

4. The receiving parties will take reasonable precautions to hold such Information in confidence for a period of five (5) years from the date of receipt of Information under this Agreement, and during such period will use such Information only in connection with this Program and will make such Information available only to its employees having a "need-to-know" in order to carry out their functions in connection with such effort. A party will be considered to have taken reasonable precautions to prevent disclosure to the public of Information if the party receiving such Information utilized the same controls it employs to avoid disclosure, publication, or dissemination of its own Information. Unless authorized in writing by the party originally transmitting such Information hereunder, the receiving parties will not otherwise use or disclose such Information during the aforementioned five (5) year period, except that it may be disclosed by any party to the Government in connection with the Program, provided any such disclosure bears the restrictive legend of either FAR 52.215-12, DoD FAR Supplement Part 27, FAR 52.227-13, FAR 52.227-14 and DoD FAR Supplement 252.227-7014(b), or a substantially identical successor provision. Information furnished and all copies thereof shall be disposed of after the expiration of this Agreement by return to the respective parties or destroyed and a written certification to this effect provided.

5. Information shall not be afforded the protection of this Agreement if on the effective date hereof, such Information has been or from the time thereafter that such Information is:

- a. developed by the receiving parties independently of the furnishing party; or
- b. rightly obtained without restriction by the receiving parties from a third party; or
- c. publicly available other than through the fault or negligence of the receiving parties; or

- d. released without restriction by the furnishing party to anyone, including the United States Government; or
- e. known to the receiving parties at the time of disclosure; or
- f. disclosed by the furnishing party to the receiving parties after expiration of this agreement; or
- g. received after notification to the furnishing party in writing that no further proprietary information is desired by the receiving parties.
- h. If any part of the Proprietary Information has been or hereafter shall be disclosed in a United States patent issued to the party furnishing the Proprietary Information hereunder, then, after the issuance of said patent, the limitations on such Proprietary Information as is disclosed in the patent shall be only those afforded by the United States patent laws.

The burden of proof for the afore said conditions shall rest entirely with the party claiming exemption under this agreement.

6. Should the receiving parties be faced with legal action or a requirement under Government regulations to disclose proprietary information received hereunder, the receiving parties shall forthwith notify the furnishing party, and upon the request of the latter, shall cooperate with the furnishing party in contesting or complying with such a disclosure. Except in connection with a failure to discharge responsibilities set forth in the preceding sentence, no party shall be liable in damages for any disclosures pursuant to judicial action or Government regulations or for inadvertent disclosure where the customary degree of care has been exercised, provided that upon discovery of such inadvertent disclosure or use, it shall have endeavored to prevent any further inadvertent disclosure or use.

7. No license to any party under any trademark, patent, or copyright, or applications which are now or may thereafter be owned by such party, is either granted or implied by the conveying of such information to the other parties. None of the information which may be submitted or exchanged by the parties shall constitute any representation, warranty, assurance, guarantee or inducement by any party to the others with respect to the infringement of trademarks, patents, copyrights, or any right of privacy, or other rights to third persons.

8. This Agreement shall be governed by and interpreted in accordance with the laws of the State of Oklahoma.

9. Both parties acknowledge that disclosure of any Proprietary Information by either party, will give rise to irreparable injury to the other party inadequately compensable in

monetary damages. Accordingly, the damaged party may seek and shall be entitled to obtain injunctive relief against the breach or threatened breach of the obligations of this section, in addition to any other remedies which may be available.

IN WITNESS thereof, the parties have caused this Agreement to be duly executed on the day and year first above written.

LB&M Associates, Inc. _____

By: _____

By: _____

Title: _____

Title: _____

Date: _____

Date: _____

**Appendix F : VENDOR SELECTION
CRITERIA ATTACHMENT**

As part of the work to be performed under the technology demonstration, LB&M is assisting the US Army Environmental Center (USAEC) in the selection of a technology vendor. LB&M has compiled a list of companies involved in such technology and will also evaluate and rank the offerors on their ability to conduct the demonstration. LB&M is obligated to make balanced, objective, and totally objective recommendations of vendor qualifications to USAEC and to safeguard sensitive information provided by the offerors.

LB&M is not participating in the electrokinetics demonstration other than as manager of the site. LB&M has no agreement or understanding with any other company, nor has it solicited or received an offer from any company to perform any part of the actual electrokinetic demonstration.

Because selection means financial benefit to the vendor selected, every effort is made to ensure the objectivity of the selection process. The criteria elements are intended to be independently verifiable, and to be sufficiently detailed to ensure that no vendor is arbitrarily excluded or included. Offerors providing sensitive information for the evaluation and selection process will be covered by a nondisclosure agreement with LB&M.

The criteria that will be used to rank the vendors will be divided into four groups:

- Technology/Methodology
- Scientific Background
- General Company History/Background
- Cost Analysis/Cost History of Technology

Each of the principal groups will be further subdivided into categories that detail advantages and disadvantages of the technology and the offeror. The specific description of the elements of each group is given in the following pages.

Please check the appropriate diamond to indicate information you are submitting.

NOTE: Unmarked diamonds will be considered deficient and treated as such. For LB&M to properly and objectively evaluate potential vendors, all of the requested information must be submitted.

Technology/Methodology

The rating in this section is based on the advantages and disadvantages of the vendor's proposed electrokinetic remediation technology and its potential for meeting the goals of the demonstration. There are three sub-categories in this area:

- ◊ Performance history of the technology - the vendor should show the effectiveness of the proposed technology through the following--
 - ◊ types of soil media (e.g., sand, clay, salt water, etc.) on which the proposed technology has been tested
 - ◊ types of heavy metals on which the proposed technology has been tested and demonstrated
 - ◊ scale of the technology demonstration(s) done (bench, pilot, full scale)
 - ◊ technical results of the demonstration(s) done
 - ◊ number of sites remediated in pilot or full-scale tests
- ◊ Support requirements - the vendor should address any special considerations for support required in the following areas --
 - ◊ electrical power requirements (i.e., phase, voltage, amperage) that must be supplied to the site
 - ◊ water requirements (i.e., quality, pressure, flow rate, storage capacity) that must be supplied to the site
 - ◊ technical support (e.g., buildings or shelters, communications, drilling, etc.) that are required at the site
 - ◊ electrode support or handling considerations due to poisoning/polarization of electrodes or other maintenance requirements

- ◊ Waste Extraction and Handling Methods, and Waste Disposal - the vendor should address all special considerations related to the following --
 - ◊ methods and safety issues related to waste extraction and handling of the contaminants removed from the pits, e.g. how metals and contaminants will be extracted or isolated (electroplating or removal of metals and other contaminants in solution, etc.)
 - ◊ provisions and criteria for disposal of the waste products from the technology process.
- ◊ Special hazards or conditions - the vendor should address any other special conditions or hazards, not covered elsewhere, which would have a bearing on assessing the proposed technology. This may consist of such things as the risk associated with the types of electrolyte conditioning additives, or safety hazards associated with the electric power system used for the technology, etc.

Scientific Background

The rating in this section is based on the scientific background of the vendor's organization as related to its ability to support and sustain the demonstration effort. There are three sub-categories to be rated in this area:

- ◊ Type of business - the vendor should show that the business is organized and experienced in such a manner as to be able to perform the scientific, engineering and other technical tasks required for the technology demonstration.
- ◊ Project activity - the vendor should provide data on actual projects which are the same as or similar to the proposed technology--
 - ◊ completed projects
 - ◊ on-going projects
 - ◊ most recent project(s)
- ◊ Principal investigator - the vendor should provide information concerning the technical qualifications of the staff member who will be chiefly responsible for the demonstration work --

- ◊ specific academic degree
- ◊ field experience
- ◊ publications/presentations
- ◊ availability of a support laboratory

General Company History/Background

The rating in this section is based on the history of the vendor's organization as related to its ability to support and sustain the demonstration effort. There are five sub-categories to be rated in this area:

- ◊ Financial status - the vendor should present information showing that it has the resources to support its ordinary business operations over the expected life of the demonstration.
- ◊ Personnel base - the vendor should show its organization to have the depth and mix of personnel necessary to support both technical and administrative operations over the life of the demonstration.
- ◊ Years in business - the vendor is expected to show a history of business activity that indicates its ability to perform work that is the same or similar to that sought for the technology demonstration.
- ◊ Safety record - the vendor should present a safety plan and safety information (i.e., accidents, injuries, deaths) related to the performance of the same or similar types of work as required in the technology demonstration.
- ◊ References - the vendor should provide appropriate references that are able to support claims made for history and performance of the same or related work.

Cost Analysis/Cost History of Technology

The rating in this section is based on the cost associated with the technology offered. The vendor is expected to present knowledge of costs per unit of remediation value, and to show the costs included in the offer and the costs expected to be picked up by the government. Information to be provided should consist of:

- ◊ Overall costs per unit of remediation value; e.g., dollars per unit weight or unit volume of soil treated, dollars per unit weight of contaminant(s) removed; indicate whether costs are theoretical or actual.
- ◊ Power requirements in kilowatt-hours per unit of remediation value. The Government will furnish power to the demonstration site.
- ◊ Water requirements in gallons per unit of remediation value. The Government will furnish water to the demonstration site.
- ◊ Labor effort in man-hours per unit of remediation value.
- ◊ Known factors or assumption vendor has used to compute cost figures.

Appendix G : VENDOR SELECTION CRITERIA TABLES AND SCORES

Criteria	Range	Score	Criteria for Scoring
TECHNOLOGY AND PERFORMANCE HISTORY	50		
TECHNOLOGY	15		
<i>ADDITIONAL HAZARDS? (list type/score)</i>	5		SCORE: 5 = HAZARDS ADDRESSED; DEDUCT W/ DECREASING INFO
<i>IDENTIFICATION OF ADDITIVES</i>	5		SCORE: 5 = ADDITIVES CLEARLY IDENTIFIED; DEDUCT W/ LESS INFO
<i>WASTE EXTRACTION AND DISPOSAL</i>	5		SCORE: 5 = CLEARLY ADDRESSED - PARTIALLY ADDRESSED
SUPPORT REQUIREMENTS	10		
ELECTRICAL POWER	2		SCORE: 2 = CLEARLY IDENTIFIED; 1 = PARTIALLY IDENTIFIED
WATER	2		SCORE: 2 = CLEARLY IDENTIFIED; 1 = PARTIALLY IDENTIFIED
TECHNICAL SUPPORT	3		SCORE: 3 = CLEARLY IDENTIFIED - 1 = PARTIALLY IDENTIFIED
ELECTRODE TYPE	3		SCORE: 2 = CLEARLY IDENTIFIED - 1 = PARTIALLY IDENTIFIED
PERFORMANCE HISTORY	25		
CONTAMINANTS REMOVED	5		SCORE: 5=CHROMIUM; 3=HEAVY METALS
MEDIA REMEDIATION PERFORMED	5		SCORE: 5=SAND; 3=CLAY
SCALE OF DEMONSTRATION	10		SCORE: 1-4=LAB SCALE; 5-10=DEMO SCALE
TECHNICAL RESULTS	3		SCORE: ALL RESULTS-LAB & FIELD
NUMBER OF SITES REMEDIATED	2		SCORE: 1=ONE SITE; 2=>ONE SITE
SCIENCE BACKGROUND	25		
TYPE OF FIRM	10		SCORE: 10 = TECHNICAL/ENVIRONMENTAL; DEDUCT W/ LESS TECH. FOCUS
YEARS IN BUSINESS	6		
LATEST PROJECTS	2		SCORE: 2 = LIST OF LATEST PROJECTS >1

ONGOING PROJECTS	2	SCORE: 2 = LIST OF ONGOING PROJECTS
FINISHED PROJECTS	2	SCORE: 2 = LIST OF FINISHED PROJECTS > 1
PRINCIPAL INVESTIGATOR	9	
SPECIFIC DEGREE	3	SCORE: 1=BS; 2=MS; 3=Phd
FIELD EXPERIENCE	2	SCORE: 2 = >5 YRS. EXP. W/EK; 1 = < 5 YRS EXP W/EK
PUBLICATIONS/PRESENTATIONS	2	SCORE: 2 = DETAILED LIST OF PUBS BY PRINC INVESTIG; 1 = PART. LIST
SUPPORT LABORATORY	2	SCORE: 2 = IDENTIFIED SUPP LAB; 1 = NO LAB IDENTIFIED
COMPANY HISTORY & SCIENCE BACKGROUND	15	
FINANCIAL	3	SCORE: 3 = STRONG FINANCIAL HISTORY
PERSONNEL BASE	3	SCORE: 3 = STRONG TECHNICALLY-ORIENTED PERSONNEL BASE
YEARS IN BUSINESS	3	SCORE: 3 = >5 YEARS IN BUSINESS
SAFETY RECORD	3	SCORE: 3 = EXCELLENT SAFETY RECORD FOR PROPOSED TECHNOLOGY
REFERENCES	3	SCORE: 3 = LIST OF REFERENCES; <2 PARTIAL OR DEFICIENT LIST
COST ANALYSIS AND COST HISTORY	10	
WHAT DOES COST INCLUDE?	10	SCORE: 10 = COST SUMMARY OF TECHNOLOGY DEMONSTRATIONS
TOTAL POINTS AVAILABLE	100	TOTAL POINTS OBTAINED

Appendix H : OFFER TO SUBMIT ORAL AND WRITTEN PROPOSALS

March 7, 1997

Electrokinetics Technology Provider
ATTN: Point of Contact
Mailing Address
City, State ZIP

Dear Mr./Ms. Point of Contact:

I would like to invite you to submit a written and oral proposal to perform an electrokinetic technical demonstration at Naval Air Weapons Station Point Mugu, CA. The presentation will be held at the Lawton Office of LB&M Associates, Inc. on April ??, 1997. Enclosed is a data package containing instructions for the written proposal, oral presentations, and necessary site information.

The written proposal and oral presentation will be in accordance with the attached Statement of Work.

Presentations will be evaluated before a panel of five persons consisting of technical advisors from LB&M, the US Army Environmental Center, and US Army Corps of Engineers Waterways Experiment Station. The vendor selected to perform the technology demonstration will be made by LB&M.

If you have any questions, please contact me or Mr. Jack Haley.

Most sincerely,

Martin A. Wills
Project Geologist
Environmental Services

Appendix I : VENDOR INFORMATION PACKAGE

ELECTROKINETIC DEMONSTRATION
NAVAL AIR WEAPONS STATION
POINT MUGU, CALIFORNIA

Task Order Number: 5
Contract Number: DAA-93-D-0009

Prepared for

Vendor
Address
City, STATE, ZIP Code

Prepared by
LB&M Associates, Inc.
211 S.W. 'A' Avenue
Lawton, OK 73501-4051

DESCRIPTION AND STATEMENT OF WORK

INTRODUCTION

Site Description

The US Army Environmental Center (USAEC) will sponsor a technology demonstration of electrokinetic remediation of soils contaminated with heavy metals. The demonstration will be conducted in cooperation with the Environmental Security Technology Certification Program (ESTCP) and the Southwest Division, Naval Facilities Engineering Command (NAVFAC SOUTHWEST DIV). The technology demonstration will be conducted in and around former chemical waste pits at the Naval Air Weapons Station (NAWS), Point Mugu, California, at Site 5 - Old Area 6 Shops (the Site).

Location

Located in Ventura County, California, the NAWS Point Mugu Site reservation comprises approximately 4,500 acres in the western portion of the Ventura Basin. The installation is approximately 50 miles northwest of Los Angeles and borders the western slopes of the Santa Monica Mountains. Past military and industrial operations at NAWS Point Mugu included electroplating and metal finishing processes, explosive and propellant manufacturing and use, and the use of lead-based paints. These operations resulted in large tracts of land being contaminated with heavy metals. Contaminants at the Site 5 area resulted from laboratory and shop operations and include waste plating rinsate, waste photographer fixer and developer, chlorinated compounds, rocket fuel, organic solvents and heavy metal compounds.

Site 5 is immediately adjacent to a large tidal marsh that is one of the major coastal wetlands surviving in the United States. A number of marine mammals, aquatic and wading birds, fish and animal species, including several endangered and/or protected ones species, reside in this marsh area. The light-footed clapper rail, an endangered bird, is known to nest near in the Site 5 area. Therefore, intrusive or noisy activities in the area are restricted during the period 15 February - 15 September. All activity at the Site 5 area must be cleared through the NAWS Point Mugu natural resources manager before work can begin.

As part of the work to be performed under the technology demonstration, LB&M Associates, Inc. is contracted by the USAEC to conduct an electrokinetic technology demonstration at Site 5 and assess the technology's performance.

STATEMENT OF WORK

Electrokinetics Demonstration

The technology demonstration will use an electrokinetic process to separate metals contaminants from the soil through the application of low amperage direct currents across an array of electrodes placed in the contaminated soil. The electrokinetics technology demonstration will be conducted in two test cells at Site - 5 on NAWS Point Mugu. Each test cell will be operated and monitored as separate units. The first test cell (TC #1) will encompass the two existing waste pits and their berms (approximately 60 X 40 foot area). Contaminant depth of 11 feet is expected in this test cell. An electrically non-conductive barrier wall of driven sheet pile will be installed around the pits to a depth of 20 feet to mitigate the effects of groundwater flow and the tidal effects within the pit area. The second test cell (TC #2) will encompass a 30 X 100 foot area immediately north of TC #1 in the tidal marsh. Contaminant depth of 2 feet is expected in this test cell. No protective barrier will be installed around this test cell. TC #2 will be open to both groundwater flow and tidal effects. TC #1 will be operated and monitored until contaminant levels are reduced to the established targets (or for a maximum of nine months). After the initial three months of TC #1 operation and monitoring, the system will be assessed for its ability to control its treatment area chemistry, electric field, and contaminant transport. Once adequate process control has been proven, operation of the electrokinetics system in TC #2 will be initiated. TC #2 will be operated and monitored until contaminant levels are reduced to the established targets (or for a maximum of six months).

Containment Barrier Wall

Under a separate LB&M subcontract, an engineering contractor will install an electrically non-conductive barrier wall around Test Cell 1 to restrict the potential for migration of mobile species outside of the demonstration area. Installation of the containment wall will be completed prior to electrokinetic system installation.

Electrolyte Solution and System Additives

The electrokinetics system will consist of an array of electrode wells will be installed to a depth a depth sufficient to extract the contaminants from the soil. The electrode wells will contain the electrodes and the amended electrolyte. Electrode well design and spacing and electrolyte amendments requirements shall be specified and provided by the vendor to suit site conditions. All support equipment required to operate the electrode array and amend the electrolyte solutions shall be specified and provided by the vendor. The metal species that collect at the electrodes will be removed through electrolyte processing to extract the metal ionic species and/or periodic electrode removal and stripping of plated metals from the electrode surface. The methods required for removal of the metals from the electrode wells will be specified and provided by the vendor. The waste generated by the process shall be disposed of by the vendor as a hazardous waste.

Gases produced in the electrode wells shall be monitored by the vendor to ensure the system is operated safely. The gases expected to be produced include hydrogen, oxygen, and chlorine. All equipment for the electrokinetics system (i.e. electrolyte treatment and amendment equipment, gas monitoring equipment, electrical equipment, etc.) shall be provided by the vendor.

Task Descriptions

The Vendor shall design, construct, install, operate, and remove the electrokinetics system within the treatment area as stated in the following text. All work conducted under this project shall be in strict compliance with EPA guidelines Code of Federal Regulations (40 CFR 265, and 49 CFR 171.8) and California Code of Regulations (CCR 66265), Occupational Safety and Health Act standards (29 CFR 1910 and 1926) and California Labor Code Section (640.1), and shall comply with Department of the Army Regulations (AMCR 385-100, Safety Manual).

FOR THE WRITTEN PROPOSAL, THE LEVEL OF DETAIL SHOULD FOCUS ON ITEMS BELOW: The technical proposal will contain a detailed description of the vendor's approach to:

- Technology Research and Development
- System Design and Pre-Deployment
- Utility Estimates
- Equipment Deployment
- System Installation
- Health and Safety Plan
- Process Waste Classification and Disposal
- Progress and Final Reports

Technology Research and Development

The vendor shall engage in laboratory treatment studies as needed to support the electrokinetic technology field demonstration. The vendor will be provided detailed treatment study data from the US Army Corps of Engineers Waterways Experiment Station (USACEWES); the vendor is encouraged to work with USACEWES to develop the most effective electrokinetic system for the demonstration. The on-going USACEWES treatability study includes: charge balance analyses, electrolyte conditioning studies, equilibrium migration studies, biota impact effect studies, permeability investigations, electrode placement studies, time vs. treatment analysis, removal efficiency, brackish water effects, power usage, and operation factors that may effect the overall cost of implementation of the electrokinetics. LB&M Associates, Inc. is currently analyzing samples for the initial site characterization of Site - 5 at NAWS Point Mugu. This site characterization will provide a complete contaminant profile for both test cells and the area immediately surrounding the test cells. Analyses to be conducted include total metals, toxic characteristic leachate potential (TCLP), California waste-

extraction test (WET), pH, total charge balance, chromium species, volatile organic compounds (VOC), semi-volatile organic compounds (SVOC), polycyclic aromatic hydrocarbons (PAH), pesticides, and polychlorinated biphenols (PCB). Also, human health and ecological risk assessments will be performed to establish target clean-up levels for the demonstration. Site-specific information regarding geology, hydrogeology, topography, climate, and any technical information relative to the technology demonstration, can be found in SECTION B.

System Design and Pre-Deployment

The vendor will design the electrokinetics system for use in the demonstration. The electrokinetics system design shall include installation, operation, and removal procedures and will be included incorporated into the Demonstration Work Plan provided by LB&M.

Estimated Utility Requirements

The vendor shall provide a list of utility and site requirements needed to support the technology demonstration. The utility requirements shall include electrical power, water, telecommunications.

Equipment Deployment

All major components of the electrokinetics system shall be operationally checked on receipt at the site. The vendor shall ship and be staged, ready for installation at the site no later than 15 December 1997. The vendor shall coordinate deployment with the LB&M Project Leader.

System Installation

The vendor shall install the electrokinetics system in accordance with the Demonstration Work Plan and the Demonstration Permit (CCR 66270.63) approved by Cal-EPA's Department of Toxic Substances (DTSC). Installation of the electrokinetics system shall begin after installation of the site barrier wall has been completed (Subsection 2.1.1). The electrokinetics system shall be installed and ready for operation at the site no later than 15 February 1998.

Electrokinetics System Operation

The performance of the technology will be assessed based on its ability to reduce metal contaminant levels. Specifically, the technology will be assessed on its ability to reduce cadmium and chromium concentrations below the total threshold limit concentrations (TTLC) as specified in the California Code of Regulations, Title 22, Section 66261.24. The technology will also be assessed on its ability to reduce cadmium, chromium, and other metal contaminants to below concentrations considered to be human health risk or

ecological risk (as determined by the initial site characterization analysis results). TC #1 will be operated and monitored until contaminant levels are reduced to the established targets (or for a maximum of 9 months). After the initial 3 months of TC #1 operation and monitoring, the system will be assessed for its ability to control its treatment area chemistry, electric field, and contaminant transport. Once adequate process control has been proven, operation of the electrokinetics system in TC #2 will be initiated. TC #2 will be operated and monitored until contaminant levels are reduced to the established targets (or for a maximum of 6 months).

Health and Safety Plans

The vendor shall include a detailed safety plan covering the installation, operation, and removal of the electrokinetics system; this will be incorporated into the LB&M Site Health and Safety Plan (HSP). The vendor's HSP will be reviewed by the LB&M Safety Officer, USAEC, and DTSC, and must be approved prior to the start of work. Health and safety issues revealed during the demonstration will be immediately evaluated by LB&M and the vendor to ensure that all persons at or around the site are operating under safe conditions. All changes to the vendor's safety plan must be approved by LB&M, USAEC, DTSC, and NAWS Point Mugu prior to the demonstration.

Technology Sampling

Technology sampling will be performed both by the vendor and LB&M. The purpose of the vendor's process control sampling will be to monitor the effectiveness of the technology during the demonstration and to ensure that the system is being contained within the test cell. LB&M will sample the soil and water (surface and subsurface) to monitor the effectiveness of the technology process for removing metals from the contaminated media. Additional wells (piezometers), installed by LB&M, will be located outside of the test cell area to monitor the migration of metals or other substances outside of the barrier wall containment area.

- Vendor Sampling Requirements**

The vendor shall perform sampling of all electrode-bearing wells prior to initiation of current to establish baseline concentrations of the contaminants. During the demonstration, the vendor will establish a process control sampling protocol to monitor the system's effectiveness and control of the technology demonstration. The vendor shall supply to LB&M duplicate samples for analysis at a laboratory specified by LB&M. Duplicate sampling will corroborate results reported by the vendor's laboratory. One duplicate sample delivered to LB&M shall be taken for every ten process control samples removed by the vendor.

- **LB&M Sampling Requirements**

During system operation, LB&M will independently take soil and water samples at locations approximating those sampled during LB&M's February 1997 Characterization Study. LB&M will sample the site twice monthly to establish the effectiveness of the technology demonstration. LB&M's sampling schedule is expected to be:

- Weekly for the first month
- Monthly from months two and three
- Monthly until end of the demonstration

Disposal of Waste Produced by the Electrokinetic Demonstration

NAWS Point Mugu is the generator of the waste removed from the site. The vendor shall be responsible for the safe removal, handling/storage, and appropriate disposal of the waste generated during the technology demonstration, in accordance with all state and federal regulatory requirements. The vendor will prepare all documents related to the disposal of waste generated by the technology demonstration. NAWS Point Mugu will sign manifest documents as the waste generator.

Preparation and Submission of Progress Reports

LB&M shall prepare technical data reports that describe the progress and results of the technology demonstration. The vendor shall provide data from the technology demonstration and technical support to LB&M in development of the technical data reports on a schedule established before commencement of work.

The vendor shall participate in and/or conduct In Progress Review (IPR) meetings with LB&M, Government and regulatory agencies at NAWS Point Mugu for technical review, and to discuss and evaluate program and technical issues related to the demonstration. A tentative schedule of the meetings is provided below:

- Month 0: Pre-Deployment Stage and Meeting
- Month 1: Post-Startup/Operation Progress Review
- Month 3/At Optimum Operating Conditions: Progress Review
 - Regulatory Review of Demonstration Effectiveness and Evaluation for Commencement of Demonstration System for Test Cell #2.
 - Review for Installation of Demonstration System for Test Cell #2.
- Month 6: Progress Review
- Month 9: Field demonstration for Interested Parties

SITE SPECIFIC DATA

GENERAL STATEMENT

The information contained in this section should be sufficient to formulate a written and oral proposal for the technology demonstration at NAWS Point Mugu, CA. Questions concerning any of the information that follows should be directed to Mr. Martin Wills at LB&M, Lawton Office. Any questions will be in accordance with the following format:

- All questions will be submitted on or before March 24, 1997;
- All questions will be in writing to LB&M;
- All questions submitted to LB&M and the subsequent answers, will be made available to all vendors participating in the oral presentations.

Site Description

Located in Ventura County, California, the Site comprises approximately 4,500 acres in the western portion of the Ventura Basin (Figure 1). The installation is approximately 50 miles northwest of Los Angeles and borders the western slopes of the Santa Monica Mountains.

A number of outlying facilities at Camarillo Airport, Laguna Peak, and San Nicolas Island add to the total acreage. The main base is flanked by Highway 1 on the north and east, the Pacific Ocean on the south and west; a Ventura County Game Reserve on the west and northwest (Figure 2). Historically, the base has been a salt marsh-beach zone environment. NAWS Point Mugu is situated in the western portion of the Ventura Basin, a relatively broad, level floodplain and river delta formed by the Santa Clara River. The Santa Monica Mountains to the east and the Santa Ynez Mountains to the north form the boundaries of the basin.

Ecological Setting

The NAWS Point Mugu area contains an extensive tidal marsh area, and is one of the larger remaining coastal wetlands in the United States. The Site 5 area is immediately adjacent to part of this coastal wetland. Impact on this area during field operations will be minimized through the use of shortest paths to monitoring areas and keeping personnel intrusion to a minimum.

The light-footed clapper rail, a federally and state listed endangered species, nests in this marsh area during the period February 15 - September 15. Noisy or intrusive activities are not permitted during the nesting season. All activities must be cleared with the NAWS Point Mugu wildlife and natural resources specialists charged with protecting this area. No work will be undertaken until the specialists have determined that it is safe.

Climate

The climate in the vicinity of NAWS Point Mugu is influenced by the coastal setting of the installation, which results in a moderately humid climate with mild, moist winters and warm, dry summers (PRC, 1993). Based on climatological data obtained by the NAWS Point Mugu weather station, the average annual temperature is approximately 58 degrees Fahrenheit (F°). The average minimum temperatures range from 44°F in January to 58°F in August; average maximum monthly temperatures range from 62.0°F in January to 71.8°F in September. Average monthly humidity ranges from a minimum of 43 percent to a maximum of 96 percent (PRC, 1993).

Topography and Tidal Influences

The ground surface at the NAWS Point Mugu is relatively flat with elevations over most of the base ranging from sea level to approximately 11 feet above mean sea level (MSL) (SCS and Landau Associates, 1985). At one isolated area in the south central portion of the base, the elevation rises to approximately 26 feet above MSL.

Mugu Lagoon is relatively shallow (generally less than 10 feet in depth) and water levels are significantly influenced by tides. Circulation patterns within the lagoon are characterized by slow water circulation and flushing rates in the extreme western portion of the lagoon and moderate to fast mixing and flushing rates in the eastern and central sections of the lagoon (PRC 1993)

Mugu Lagoon receives sediments from its tributaries and from tidal action. On the average, 54 acre-feet (87,000 yd³) of sediment are deposited annually into Mugu Lagoon (PRC, 1993). Sedimentation rates increase during storm events, as runoff increases flows in Calleguas Creek and other tributaries. Most sediment enters the lagoon in suspension and settles due to low flow velocities in the lagoon and its tributaries

Geology

NAWS Point Mugu lies in the southern portion of the Ventura Basin, within the Transverse Ranges geomorphic province (PRC, 1993). The Transverse Ranges province consists of highlands, basins, and east-west trending folds resulting from regional strike-slip and thrust faulting. The Ventura Basin lies immediately west of the foot of the Santa Monica Mountains, which are composed of Miocene age volcanic and marine deposits (PRC, 1993).

The Ventura Basin has been infilled by more than 40,000 feet of sediment, resulting in a broad coastal lowland known as the Oxnard Plain. The upper approximately 2,000 feet of the sediment are unconsolidated water-bearing deposits of Pleistocene to Holocene age.

The unconsolidated Pleistocene to Holocene sediments in the vicinity of NAWS Point Mugu are approximately 1,500 feet thick and consist of alluvial clays, silts, sands, and gravels. The deposits occur as both laterally continuous layers and lenticular beds (PRC, 1993).

Much of the land of NAWS Point Mugu has been formed from mechanically compacted fill material. Fill material underlies the majority of the developed areas within the base (PRC, 1993). Fill thickness and composition varies widely, as does associated permeability and infiltration rates (PRC, 1993). During a February 1997 Site Characterization Study conducted by LB&M Associates, Inc., core logs revealed that the subsurface geology at Site 5 consists of fine - medium sand with lenticular and laterally continuous gravel lenses and silt/clay strata. Numerous shallow (6 - 12 foot) cores were drilled. Two monitor wells were drilled to 60 feet with full cores throughout the geologic section. Monitor well locations and the 60 foot core profiles are presented in Figures 3a and 3b.

Hydrogeology

Five aquifers have been identified within the Pleistocene to Holocene age deposits in the vicinity of NAWS Point Mugu (PRC, 1993). These aquifers are referred to, in order of increasing depth, as the Semi-perched, Oxnard, Mugu, Fox Canyon, and Grimes Canyon aquifers. A sixth aquifer, the Hueneme, is typically present between the Mugu and Fox Canyon aquifer in the Oxnard Plain area but appears to be absent beneath NAWS Point Mugu (SCS and Landau Associates, 1985). In the area of Site 5, the Semi-perched aquifer extends from the water table, approximately 5 - 10 feet below land surface (bls), to an average depth of 75 feet bls over most of the area (PRC, 1993). The regional aquifers are thought to be interconnected through sufficiently permeable aquitards that allow vertical as well as horizontal movement of ground water.

In addition, the upper aquifer system beneath NAWS Point Mugu may be hydraulically connected to submarine outcrops in the Pacific Ocean (PRC, 1993). Historically, ground water in the upper aquifer system occurred under confined conditions such that artesian flow occurred in a well near the coastal area of the basin. However, due to extensive pumping in the basin, this condition has reversed, and a landward gradient now exists (Furgro-McClelland, 1991).

Surface Water Hydrology

Surface water bodies within Site 5 consist of an intertidal channel and two former waste pits. The channel and the pits are thought to be in direct hydraulic contact with tidal fluctuations occurring twice daily. Tidal influences in the area are significant enough to partially flood the low-lying land surface during high tides.

Contaminants of Concern

The principal contaminants of concern at the Site are chromium, cadmium, copper, nickel and silver. Additional contaminants of potential concern include arsenic, beryllium, manganese, fluoride, tetrachloroethane, trichloroethene (TCE) and Aroclor-1260 (PCB trade name).

During the February 1997 Site Characterization Study, the lateral and vertical limits of the contaminants at the site were established. From laboratory analyses received, the highest concentrations of chromium and cadmium appear to be in and around the former waste pits.

Total Chromium Concentrations*

- 21,000 mg/kg (Pit 1 surface soil sample)

Hexavalent Chromium Concentrations*

- 5.9 mg/kg (Pit 2 soil sample at interval 9-10 feet)

Cadmium Concentrations*

- Maximum Concentration: 1810 mg/kg (Pit 2 surface soil sample)

Surface Water pH

- Pit 1 - 8.1
- Pit 2 - 6.8

*Contaminant concentrations are preliminary values and subject to further validation and possible change. Other contaminant concentrations are yet to be evaluated, but additional data is available upon request from Mr. Martin Wills, LB&M Associates, Inc., Lawton office.

WRITTEN PROPOSAL INSTRUCTIONS, FORMATS, AND CONDITIONS

PROPOSAL FORMAT AND CONTENT

- The vendor shall submit an overall proposal in accordance with the Statement of Work (SOW), consisting of three physically separated and detachable volumes, individually titled:
 - **VOLUME I - TECHNICAL PROPOSAL (6 copies)**
 - **VOLUME II - COST/PRICE PROPOSAL (1 copy)**
 - **ORAL PRESENTATIONS**

- All proposals, including volumes, parts, or sections for each vendor and any subcontractors, must be received by the date and time specified for receipt of proposals as identified in SECTION C, Subsection 4.1, Solicitation Schedule.
- If any portion of the work is to be performed by a subcontractor, vendors must include in their technical and cost/price proposals supporting documentation describing each subcontractor's qualifications and detailed pricing information to support all subcontractor costs.
- To aid in evaluation, proposals shall be clearly and concisely written as well as being neat, indexed, and logically assembled. All pages of each volume shall be appropriately numbered and identified with the date and the project title (Electrokinetic Demonstration: NAWS Point Mugu, CA) and free of company or firm identification. Where practical, direct reference to a firm name should be placed with "we", "this company", "our firm", or similar indefinite references.

VOLUME I TECHNICAL PROPOSAL

- Technical proposals must be sufficiently detailed to enable technically oriented personnel to make a thorough evaluation of the material and to arrive at a sound determination as to whether the vendor's approach is valid and practical and the proposed support services meet the requirements of LB&M. Therefore, the technical proposal must be specific, detailed, and complete to clearly and fully demonstrate that the vendor has a thorough understanding of the requirements for, and technical problems inherent in, the services being proposed. Clear evidence of processes previously demonstrated and currently in place relating to the various major factors should be addressed. Also, if subcontractor effort is to be proposed for any portion of the work to be performed, the same type of information shall be submitted for each subcontractor.
- In preparing the proposal, emphasis should be placed on supplying complete information in the areas set forth below. Responses to all issues is required and shall include all information that supports the issues including table and charts to provide summary information describing the proposed effort.
- The proposal submitted may contain proprietary information (trade secrets, financial information, etc.) which the vendor or its proposed subcontractor does not want disclosed for any other purpose other than the evaluation of its proposal. All such restricted information that may be contained in the proposal must be clearly marked.

Technical Proposal Structure

- The Technical Proposal shall address technical factors in the order in which they are presented below. The proposal shall provide information directly related to all subfactors defined. **NOTE: COST DATA MUST NOT BE INCLUDED IN OTHER THAT VOLUME II OF THE PROPOSAL.** In each of the following

factors, LB&M requires that the vendor present a detailed completion of the areas identified.

- Vendors should be attentive to the level of importance of each category and place appropriate emphasis in their response to the headings. Content is more important than quantity. Documents are to be printed on white, single-sided, standard letter-size paper. Typeface should be clear and easy to read. Text body shall be 12-point, but smaller fonts may be used in tables, footnotes, etc. Fold-outs are permitted in the proposals. Proposals are to be neat, legible, and orderly. Unnecessary elaborate brochures or other presentations beyond that sufficient to present a complete and effective offer are not desired and may be construed as an indication of the vendor's lack of cost consciousness. Elaborate artwork, expensive paper and bindings, expensive visual and other presentation aids are neither necessary nor desired.

Task descriptions to be addressed in the written proposal are:

- Introduction
- Company Background
- Company's Remediation History
- Key Personnel
 - The vendor shall provide complete resumes, by name, of key personnel, including the project manager and assistant manager should be provided. Information supplied shall include the background, training, skills, management experience, education, professional growth, experience on similar contracts or subcontracts, and whether the position was full-time or part-time.
 - The key personnel shall be "HAZWOPER" certified.
 - Principal Investigator/Project Manager
 - ⇒ Technology Experience
 - ⇒ Education Background
 - ⇒ Managerial Experience
- Logistical Issues
 - Provide Task Breakdowns and Descriptions
 - ⇒ Laboratory Studies
 - ⇒ Pre-Deployment
 - ⇒ Deployment
 - ⇒ Installation
 - ⇒ etc.
 - Provide System Deployment Plan
 - Provide System Operation Plan
- Technology/Methodology
 - Provide Research and Development Plan
 - Provide Deployment of Personnel and Equipment Plan
 - Provide Health and Safety Plan
- System Description

- Explain Process Kinetics
- Identify Type of Electrodes to be Used
- Discuss Distribution and Density of Electrodes
- System Additives
 - ⇒ Additive Identification - Advantages and Disadvantages
 - ⇒ Hazards Associated with Additives
- Utility Requirements
 - ⇒ Water Type and Quantity
 - ⇒ Electrical Power (voltage, phase, etc.)
 - ⇒ Communications and Technical Needs
- Sampling Protocol and System Controls
- Waste Handling, Storage, and Disposal
- Technology Demonstration Progress Reports
- Shut-down and Site Clean-up

VOLUME II - COST/PRICE

Cost Proposal Guidelines

Each vendor is required to submit cost documentation. LB&M needs this data to evaluate the realism, completeness, and reasonableness of your proposal. The burden of proof for cost credibility rests with the vendor. All information relating to the cost documentation shall be included in VOLUME II. Under no circumstances shall cost documentation be included elsewhere in the proposal. Data beyond that required by the next subsection shall not be submitted unless it is considered essential to document or support the cost/price position.

The vendor shall provide as cost documentation a detailed and complete cost breakdown consisting of material costs, subcontracts, labor costs, travel costs, indirect costs, general and administrative costs, cost of money and profit. **NOTE: THE GOVERNMENT WILL SUPPLY THE ELECTRICAL AND WATER REQUIREMENTS FOR THE DEMONSTRATION. THEREFORE, THE COST OF THE ELECTRICITY AND WATER IS NOT TO BE INCLUDED IN THE COST/PRICE PROPOSAL.**

However, the vendor needs to estimate the power usage and total electrical power costs for inclusion in the projected cost of remediated soil. Provide this summary for the total contract and for each separately priced line or skill category. Price of the project services and completion shall be presented in **U.S. Dollars per cubic meter (m³) of soil remediated.**

EVALUATION FACTORS FOR AWARD AND SOLICITATION SCHEDULE

- Proposals will be evaluated and a contract made by LB&M on the basis of Best Technology and Value. Each proposal will be evaluated on the basis of its technical and cost/price merit, technical being significantly more important than cost/price.

Separate technical and cost/price proposals are required as described in SECTION C, Subsection 2.1.

- If any portion of the work is to be performed by a subcontractor, vendors must include in their technical proposal supporting documentation describing each subcontractor's qualifications and in their cost/price proposal detailed pricing information to support the subcontractor costs.
- All vendors will be subject to a detailed technical and cost/price evaluation by respective persons who will rate each in accordance with pre-established evaluation plans. Evaluation will be made by a panel of five technical specialists: three from LB&M, one from the USAEC, and one from the USACEWES. The factors to be evaluated are as follows:
 1. Technology System
 2. Staffing Plan
 3. Personnel Management
 4. Contractor's Past Performance
- USAEC and USACEWES technical representatives will not participate in the cost/price evaluation, only in the technical assessments.
- Cost/Price proposals will not be rated or scored but will be evaluated on the basis of completeness, reasonableness, and realism.
- The vendor that provides the overall greatest value to the project will be selected. Therefore, the successful offer may not necessarily be the lowest priced proposal. Technical competency is significantly more important than price. However, price may become relatively more important as the difference in technical scores decreases.
- Five vendor proposals are expected. Therefore, uniformity of proposals is essential to assure fair and accurate assessment of each proposal. All proposals must be submitted in accordance with SECTION B and must conform to all the terms and conditions of the proposal. Failure to conform to all requirements expressed may be cause for rejection without further evaluation or discussion. Any proposal found to be grossly deficient (i.e., the proposal does not represent a reasonable effort to address itself to all elements of the solicitation and the SOW) or clearly demonstrates that the vendor does not understand the requirements of the solicitation and would require an extensive rewrite before it could be considered acceptable for evaluation will be eliminated before detailed rating of the proposal.

Solicitation Schedule

- Written proposals will be submitted to reach the Lawton office of LB&M no later than 3:00 pm on Monday, April 7, 1997. Late submissions will not be accepted.
- Oral Presentations will be scheduled for the second week in April, 1997. The specific date of your company's briefing will be provided in subsequent correspondences.

ORAL PRESENTATION OUTLINE

The vendor shall consider the format below as a *minimum* requirement for the oral presentations. Additional issues not covered in the outline may be inserted to augment the discussion as the presenter wishes. The vendor should schedule the discussion for a two-hour presentation with at least one hour at the end for questions and issues presented in the briefing.

- Introduction
- Company Background
- Company's Remediation History
- Key Personnel
 - Principal Investigator/Project Manager
 - Technology Experience
 - Education Background
 - Managerial Experience
- Logistical Issues
 - Provide Task Descriptions
 - Deployment
 - Operation
- Technology/Methodology
 - Explain Process Kinetics
 - Research and Development
 - Deployment of Personnel and Equipment
 - Health and Safety Plan
- System Description
 - Type of Electrodes to be Used
 - Distribution and Density of Electrodes
 - System Additives
 - Additive Identification - Advantages and Disadvantages
 - Hazards Associated with Additives
- Utility Requirements
 - Water Type and Quantity
 - Electrical Power (voltage, phase, etc.)
 - Communications and Technical Needs
- Sampling Protocol and System Controls
- Waste Handling, Storage, and Disposal
- Technology Demonstration Progress Reports
- System Shut-down and Site Clean-up

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PRC Environmental Management, Inc. and James M. Montgomery, Consulting Engineers, Inc., 1993, Remedial Investigation/Feasibility Study: Sites 1, 2, 4, 5, 6, 8, 9, and 11. Naval Air Weapons Station Point Mugu, California; Contract Task Order Number: 0225, Contract Number: N62474-88-D-5086.

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**Appendix J : CORRPRO LETTER OF
WITHDRAWL FROM SELECTION PROCESS**



"A Commitment to Excellence"

April 7, 1997

Mr. Martin A. Wills
LB&M Associates, Inc.
211 S.W. "A" Avenue
Lawton, OK 73501-4051

610 Brandywine Pkwy. • West Chester, PA 1938
Tel. 610/344-7002, Fax 610/344-7092

SUBJECT: Proposal for Electrokinetics Technology Demonstration at the Naval Air Weapons Station, Point Mugu, California, Task Order No. 5, Contract No. DAA-93-D-0009

Dear Mr. Wills:

After much consideration, Corrpro has decided not to submit a proposal for the subject RFP. We base this decision on our review of both the RFP and U.S. Army Waterways Experiment Station (WES) report. Based on this review, we conclude that the technology for removal of trivalent chromium is not ready for deployment at the Point Mugu sites. Further, based on the data presented in the WES report, it appears that premature application of this technology might well extend the region of contamination by mobilizing the pollutants without removing them.

Although extensive and thorough, the investigation conducted by WES, as presented in the report, did not indicate an enhancement reagent that would result in effective transport of the trivalent chromium in an electric field. Oxalate is normally an appropriate enhancement reagent for trivalent chromium, and did dissolve the chromium in the WES tests, but the characteristics of the dissolved species in the highly saline environment of the Mugu site have not been adequately studied. Of considerable concern is the evidence from the W-cell tests that indicate that the dissolved species are in fact not transported in an electric field. It is noted that in the one electrokinetic test that has been completed to date (with the proprietary reagent Cadex), chromium removal was only 5 percent in 50 days. Of course, simply adding strong acids, such as nitric, to promote dissolution would be environmentally unacceptable.

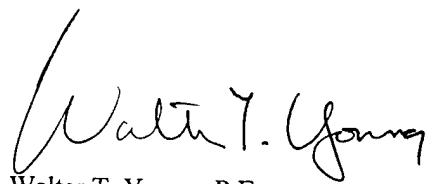
Enhancement reagents that we have in mind, including some of the new introductions that are highly specific to the contaminant metals of interest, and which are environmentally benign, have not been proven at the specific conditions at Point Mugu. We feel strongly, that because of possible interactions with the saline water as well as with the co-disposed pollutants and naturally occurring organics, more detailed study is required. Professor Ronald Probstein at the Massachusetts Institute of Technology, our partner in this project, has recommended an intense short term study to identify an optimum reagent for the Mugu site.

As the required type of investigation does not fit the scope of the RFP, and in view of the great environmental sensitivity of the area, we feel that it would be irresponsible to proceed with this project at this stage. Consequently, we must reluctantly decline the invitation to bid, at least until such time as these important issues have been resolved.

Anchorage	Boston	Cleveland	Geneva	Lafayette	Malaysia	Ocean City	San Francisco	Singapore
Atlanta	Calgary	Detroit	Hong Kong	Lisbon	Milwaukee	Philadelphia	San Diego	Stockton On Tees
Bahrain	Charlotte	Dhahran	Houston	London	Minneapolis	Phoenix	Seattle	Vancouver
Billings	Chicago	Edmonton	Jakarta	Los Angeles	New Orleans	Regina	Sharjah	Washington, DC

We appreciate the opportunity to submit a proposal for this project, and hope to work with you in the future.

Very truly yours,



Walter T. Young, P.E.
Chief Engineer

{lb&m4.doc}

**Appendix K : FLUOR DANIEL
GTI/GEOKINETICS LETTER OF
WITHDRAWL FROM SELECTION PROCESS**



April 3, 1997

Mr. Martin A. Wills
LB&M Associates, Inc.
211 S.W. 'A' Avenue
Lawton, Oklahoma 73501

Dear Mr. Wills:

We are in receipt of your Request for Proposal dated 17 March 1997 requesting a proposal and oral presentation for a demonstration project of electrokinetic technology at Point Magu, CA. Our technology supplier for this demonstration, Geokinetics International, Inc. (GII), has reviewed the RFP in detail and has concluded that you are inviting full and open competition on a proprietary technology patent protected by GII. I am forwarding their correspondence that was sent to me for your information.

In as much as GII is unwilling to proceed on this project as currently contemplated the FDGTI/GII Team must regrettably decline your offer to attend the oral presentation scheduled for the second week in April. We are however prepared to initiate immediate discussions to perform a "sole source" demonstration at terms which are advantageous to the Government.

We are anxious to work with you and your project sponsors to reach early resolution of this issue. If we may be of assistance please call my Army Program Manager Sandy Davis at (864) 281-8341 or, for technical information, call Dr. Clarke directly at (510) 704-2941.

Sincerely,

A handwritten signature in black ink, appearing to read 'Rhonnie L. Smith'.

Rhonnie L. Smith
Vice President

Enclosures:

cc:

U.S. Army Environmental Center
U.S. Army Corps of Engineers Waterways Experiment Station
SWDIV, Naval Facilities Engineering Command

100 Fluor Daniel Drive / Greenville, SC 29607-2762 USA (864) 281-8000



We were very concerned to learn that the Vendor Package supplied by LB&M requires the use of the Pool Process for performance of the work. As you are aware, this project opportunity is the subject of an open bid process and to our knowledge the procurement process does not require vendors to provide evidence of appropriate licenses or rights to the Pool Process. Consequently, we believe that the procurement process represents an "inducement to infringe" under US patent law. Accordingly, Geokinetics cannot support such a process as to do so, may materially diminish our future ability to protect our patent rights.

Therefore, I must instruct FDGTI to forward this letter to LB&M and the project sponsors. I also request that you alert them to the potential for patent violation, and to the possible implications for LB&M and the project sponsors should the demonstration project involve patent infringement. Finally, in view of these circumstances, we must regretfully instruct you to decline LB&M's invitation to attend the oral presentations.

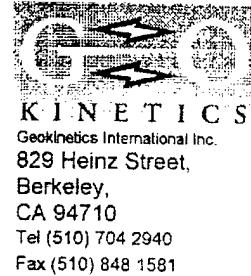
However, we again emphasize that we would be happy to perform a demonstration if we can formulate terms which are both advantageous to the Government and which protect our considerable investment in know-how and patents.

As an alternative, and if we can find a way to adequately protect our know-how, Geokinetics would be willing to consider an innovative contracting approach where the Government would have a limited license to procure our Technology through a pre-selected group of contractors thereby maintaining competitive bidding.

Yours sincerely,

A handwritten signature in black ink that reads "Steve Clarke".

Dr. Stephen R. Clarke
President & CEO
(encs 1)



To: Rhonnie Smith, Vice President
Fluor Daniel GTI
100 Fluor Daniel Drive
Greenville
SC 29607

2nd April, 1997

Re: Electrokinetic Remediation Demonstration at Point Mugu

Dear Rhonnie,

Geokinetics was both pleased and concerned to learn that in partnership with FDGTI, we have been short-listed and invited to make oral presentations of our technology and proposal. Please pass along my congratulations to your team.

Our pleasure in being short-listed is probably obvious. At the outset, Geokinetics would like FDGTI to assure LB&M, together with the project sponsors, that we are committed to the successful application of electrokinetic technology to the treatment of contaminated ground and ground water in the USA.

Moreover, our support extends to the government arena where we believe that our technology can offer the most cost effective solution for a number of government sites, thus providing the best overall service for the government. To show our commitment, we are very and able to perform a demonstration project for the US Government at terms which are commercially advantageous to the US Government.

Our concern arises from the fact that our technology is protected by several US patents. The most important of these being U.S. 5,589,056 and 5,433,829 (collectively known as the "Pool Process"). It is our sincere and considered belief that the methods and processes described in these patents are essential for the successful application of electrokinetic remediation at any practical scale. Moreover, to not use these methods is to invite technical failure. This point is made clear in several recent papers, together with the USAE Waterways / LB&M materials supplied in the Vendor Package.

Recently, we have become aware that a number of US government agencies, contractors and other companies are seeking to perform (and in some cases have performed) electrokinetic remediation using the "Pool Process" without first obtaining appropriate licenses to the technology.

In such situations, Geokinetics has no alternative but to defend its patent rights for the benefit of its licensees and other stakeholders. Consequently, Geokinetics is in the process of initiating legal actions, in protection of its patent rights, against one of these entities and is preparing actions against several more. Please see the attached document outlining our patent position.



KINETICS Geokinetics International Inc.

Patents & Papers

Background, rights and infringement issues

In 1986 & 1987 Geokinetics' founders performed the first ever successful commercial scale applications of electrokinetic remediation. This ability was based on their discovery of the relative importance of electro-migration over electro-osmosis and the absolute necessity to incorporate electrolytes with managed properties in the process. These seemingly arcane discoveries, and importantly, their timing, have very serious implications for the rapidly emerging electrokinetic industry.

Since that time Geokinetics has advanced the art considerably, to build an extensive database of completed projects and bench studies. At the same time Geokinetics has worked to protect its discoveries and intellectual property with an extensive patent portfolio. Two of Geokinetics' patents (US 5,433,829 and US 5,580,056) have the earliest priority date of any modern era electrokinetic patent (13th October 1987).

These two patents teach the use of electrolytes and managed electrolyte properties, in electrokinetic remediation. Together, these two patents (and their continuing applications) dominate all commercially useful methods for managing electrolyte pH for optimum performance. pH control through the use of managed electrolytes is now acknowledged to be the only viable method for deploying electrokinetic remediation at full scale.

Geokinetics has now developed a portfolio of 17 additional US patents and applications, covering areas such as electrodes, deployment, electrolyte management, resource recovery, etc.

Recently, a growing number of companies have entered the electrokinetic market and many also claim patent protection for their offerings. To some, it would seem that each company that claims some form of patent protection should be free to practice its technology. In the field of electrokinetics, this is almost certainly not the case. There are very significant limitations to what may be undertaken by whom and a very real possibility of patent infringement.

There are several reasons for this:-

1. applications of electrokinetics have been reported extensively for over 100 years. The use of electrokinetic phenomena to recover ionic materials from ground and ground water, represents the modern era of electrokinetics. This era has its origins in the late 1970's. By the mid 1980's, the large body of accumulated published data had significantly reduced the potential for new, robust and valuable patents;
2. Geokinetics was awarded the first of the modern era patents in Europe (Pool, Lageman et al., priority date 13th October 1987). Unfortunately, there were considerable delays prior to US publication in 1995 and 1996. Many assumed, incorrectly, that these US applications had been denied or abandoned. Probstein et al, Acar et al and others applied for and were awarded patents during the intervening period. When Pool, Lageman, et al., (I and II) were finally published in 1995 and 1996, they retained their 1987 priority date;



3. Later patents such as Acar et al., (US 5,137,608) and Probstein et al (US 5,074,985) teach the use of electroosmotic flow of an aqueous solution from the anode to the cathode. These two processes cannot be reduced to practice.;

The tables below summarize Geokinetics' US patents published, granted and pending.

Table 1 Issued & Pending Electrokinetic Patents (US)

Patent	Primary Claims	Ownership & License Fees
US 5,433,829 Priority date:- 10/13/1987	Pool Process - electrolyte management. Also - E K remediation & E K - bio'.	Owned by Geokinetics Nederlands BV. Geokinetics International has an exclusive license
US 5,589,056 Continuation of US 5,433,829. Priority date:- 10/13/1987	Additional electrolyte management strategies and processes. Also - electrolyte management for ek-bio	Owned by Geokinetics Nederlands BV. Geokinetics International has an exclusive license
US pending - passed examination awaiting publication	Deployment methods and recovering contamination from concrete	Owned by Geokinetics International
Pending	E K deployed fixation and oxidation.	Owned by Geokinetics International
Pending	Electro heated soil vapor extraction.	Owned by Geokinetics International
Pending	E K enhanced bio-remediation.	Owned by Geokinetics International

Table 2 Issued Electrode & Electrode Systems patents (US)

Patent & Status	Electrodes & electrode systems	Ownership & License Fees
US 4,422,917	Ebonex ceramic electrodes	Licensed exclusively to Geokinetics by EDA Inc.
US 4,971,666	Redox I	Licensed exclusively to Geokinetics by EDA Inc.
US 4,936,970	Redox II	Licensed exclusively to Geokinetics by EDA Inc.
US 4,964,966	Cathodic Protection	Licensed exclusively to Geokinetics by EDA Inc.
US 5,173,215	Particles and polymer matrix cable electrodes	Licensed exclusively to Geokinetics by EDA Inc.
Pending	Cable electrodes	To be licensed exclusively to Geokinetics by EDA Inc.
Pending	Pressurized "zero loss" electrode systems	To be licensed exclusively to Geokinetics by EDA Inc.
Pending	Novel electrode connector	To be licensed exclusively to Geokinetics by EDA Inc.



Table 3 Issued and pending electrolyte management patents (US)

Patent & Status	EIX and electrolyte management	Ownership & License Fees
US 4,596,641	Electrochemical ion exchange	Licensed exclusively to Geokinetics by AEA Technology Ltd.
US 4,548,695	Electrodes for EIX	Licensed exclusively to Geokinetics by AEA Technology Ltd.
US 4,790,918	EIX	Licensed exclusively to Geokinetics by AEA Technology Ltd.
US Pending	Continuous EIX	To be licensed exclusively to Geokinetics by AEA Technology Ltd.
US Pending	High surface area carbon metals recovery cell	To be licensed exclusively to Geokinetics by EDA Inc.

To summarize, Geokinetics International has, by direct ownership or executed license agreement, all of the necessary rights to perform electrokinetic remediation. Moreover, GII is not aware of any IP based impediment to its ability to perform electrokinetic remediation.

Infringement of Geokinetics' IP rights by others

Geokinetics has, in its possession, documents originating from a number of US companies illustrating the Pool Process as a component of their technology offerings. Given that none of these organizations has a license to operate the Pool Process, any such use would be a violation of Geokinetics intellectual property rights. Each of these companies has been made aware of this fact.

Geokinetics has also became aware that some have claimed that:-

1. an intermittent flow of electrolyte to the electrode array;
2. the incorporation of membranes at the surface of the electrode casings; or,
3. the addition of ion-exchange materials within the electrode casings;

would not constitute an infringement of Geokinetics patents. Examination of the claim language in the above listed patents will confirm that this is not the case.

Moreover, for most practical applications of the technology, such "work-arounds" would substantially impair remediation performance.



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(Geokinetics' papers in *bold italic*)

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Appendix L : SCORING AND RANKING FORMS

Reviewer: Dr. Ronald H. Gore

Date: 9 April, 1997

Vendor Reviewed: LYNNTECH, Inc.

Scoring Protocol

Range 0 to maximum, reviewers should use the full range for each evaluation. Too many zero or maximum scores (range manipulation by reviewer) may cause the review score to be adjusted to the mean of other reviewers. If several reviewers rank an item as 0 this may cause the proposal to be ranked as non-responsive.

INTRODUCTION (MAXIMUM AVAILABLE - 5)

- Company Background (2)
- Company's Remediation History (3)

SCORE: 5

KEY PERSONNEL - PRINCIPAL INVESTIGATOR/PROJECT MANAGER (MAXIMUM AVAILABLE - 35)

- Technology Experience (15)
- Education (5)
- Managerial Experience (10)
- Project Committed (5)

SCORE: 35

WORK PLAN OUTLINE (MAXIMUM AVAILABLE - 40)

- Provide Task Descriptions (10)
- Deployment of Personnel and Equipment (10)
- Operations (10)
- Project Team Description (10)
 - Technical Experience (5)
 - Education (5)

SCORE: 33

TECHNOLOGY/METHODOLOGY (MAXIMUM AVAILABLE - 75)

- Explain Kinetics Process (15)
- Research and Development Plan (15)
- Health and Safety Discussion (15)
- Discussion of Technology Interferences (30)
 - Saline Water Issues (10)
 - Sediment Porosity Issues (10)
 - Technical Efficiency (10)

SCORE: 70

SYSTEM DESCRIPTION (MAXIMUM AVAILABLE - 40)

- Type of Electrodes/Electrode Management Scheme (10)
- Density and Distribution of Electrodes (10)
- System Additives: identification, advantages, and disadvantages, impacts, hazards, associated with additives (20)

SCORE: 40**UTILITY REQUIREMENTS (MAXIMUM AVAILABLE - 15)**

- Water Type and Quantity (5)
- Electrical Power (voltage, phase, voltage density, etc.) (5)
- Communications and Support Issues (5)

SCORE: 13**ON-SITE OPERATIONS (MAXIMUM AVAILABLE - 60)**

- Sampling Protocols (10)
- System Controls (10)
 - Emergency Shut-down (5)
 - Process Indicators/Controls (5)
- Maintenance Protocol/Technical Support (10)
- Waste Handling Storage and Disposal (10)
- System Shut-down, removal and site clean-up (10)
- Progress Reports (10)

SCORE: 55**SUMMARY SCORE (MAXIMUM TOTAL POINTS: 300)****TOTAL SCORE: 251**

Scoring and Ranking Form Electrokinetic Vendors

Reviewer: John C. Haley

Date: 9 April, 1997

Vendor Reviewed: LYNNTech, Inc.

Scoring Protocol

Range 0 to maximum, reviewers should use the full range for each evaluation. Too many zero or maximum scores (range manipulation by reviewer) may cause the review score to be adjusted to the mean of other reviewers. If several reviewers rank an item as 0 this may cause the proposal to be ranked as non-responsive.

INTRODUCTION (MAXIMUM AVAILABLE - 5)

- Company Background (2)
- Company's Remediation History (3)

SCORE: 5

KEY PERSONNEL - PRINCIPAL INVESTIGATOR/PROJECT MANAGER (MAXIMUM AVAILABLE - 35)

- Technology Experience (15)
- Education (5)
- Managerial Experience (10)
- Project Committed (5)

SCORE: 27

WORK PLAN OUTLINE (MAXIMUM AVAILABLE - 40)

- Provide Task Descriptions (10)
- Deployment of Personnel and Equipment (10)
- Operations (10)
- Project Team Description (10)
 - Technical Experience (5)
 - Education (5)

SCORE: 33

TECHNOLOGY/METHODOLOGY (MAXIMUM AVAILABLE - 75)

- Explain Kinetics Process (15)
- Research and Development Plan (15)
- Health and Safety Discussion (15)
- Discussion of Technology Interferences (30)
 - Saline Water Issues (10)
 - Sediment Porosity Issues (10)
 - Technical Efficiency (10)

SCORE: 52**SYSTEM DESCRIPTION (MAXIMUM AVAILABLE - 40)**

- Type of Electrodes/Electrode Management Scheme (10)
- Density and Distribution of Electrodes (10)
- System Additives: identification, advantages, and disadvantages, impacts, hazards, associated with additives (20)

SCORE: 31**UTILITY REQUIREMENTS (MAXIMUM AVAILABLE - 15)**

- Water Type and Quantity (5)
- Electrical Power (voltage, phase, voltage density, etc.) (5)
- Communications and Support Issues (5)

SCORE: 12**ON-SITE OPERATIONS (MAXIMUM AVAILABLE - 60)**

- Sampling Protocols (10)
- System Controls (10)
 - Emergency Shut-down (5)
 - Process Indicators/Controls (5)
- Maintenance Protocol/Technical Support (10)
- Waste Handling Storage and Disposal (10)
- System Shut-down, removal and site clean-up (10)
- Progress Reports (10)

SCORE: 41**SUMMARY SCORE (MAXIMUM TOTAL POINTS: 300)****TOTAL SCORE: 201**

Scoring and Ranking Form Electrokinetic Vendors

Reviewer: Dr. Boyd T. Riley

Date: 9 April, 1997

Vendor Reviewed: LYNNTech, Inc.

Scoring Protocol

Range 0 to maximum, reviewers should use the full range for each evaluation. Too many zero or maximum scores (range manipulation by reviewer) may cause the review score to be adjusted to the mean of other reviewers. If several reviewers rank an item as 0 this may cause the proposal to be ranked as non-responsive.

INTRODUCTION (MAXIMUM AVAILABLE - 5)

- Company Background (2)
- Company's Remediation History (3)

SCORE: 4

KEY PERSONNEL - PRINCIPAL INVESTIGATOR/PROJECT MANAGER (MAXIMUM AVAILABLE - 35)

- Technology Experience (15)
- Education (5)
- Managerial Experience (10)
- Project Committed (5)

SCORE: 30

WORK PLAN OUTLINE (MAXIMUM AVAILABLE - 40)

- Provide Task Descriptions (10)
- Deployment of Personnel and Equipment (10)
- Operations (10)
- Project Team Description (10)
 - Technical Experience (5)
 - Education (5)

SCORE: 35

TECHNOLOGY/METHODOLOGY (MAXIMUM AVAILABLE - 75)

- Explain Kinetics Process (15)
- Research and Development Plan (15)
- Health and Safety Discussion (15)
- Discussion of Technology Interferences (30)
 - Saline Water Issues (10)
 - Sediment Porosity Issues (10)
 - Technical Efficiency (10)

SCORE: 75**SYSTEM DESCRIPTION (MAXIMUM AVAILABLE - 40)**

- Type of Electrodes/Electrode Management Scheme (10)
- Density and Distribution of Electrodes (10)
- System Additives: identification, advantages, and disadvantages, impacts, hazards, associated with additives (20)

SCORE: 40**UTILITY REQUIREMENTS (MAXIMUM AVAILABLE - 15)**

- Water Type and Quantity (5)
- Electrical Power (voltage, phase, voltage density, etc.) (5)
- Communications and Support Issues (5)

SCORE: 15**ON-SITE OPERATIONS (MAXIMUM AVAILABLE - 60)**

- Sampling Protocols (10)
- System Controls (10)
 - Emergency Shut-down (5)
 - Process Indicators/Controls (5)
- Maintenance Protocol/Technical Support (10)
- Waste Handling Storage and Disposal (10)
- System Shut-down, removal and site clean-up (10)
- Progress Reports (10)

SCORE: 55**SUMMARY SCORE (MAXIMUM TOTAL POINTS: 300)****TOTAL SCORE: 254**

Scoring and Ranking Form Electrokinetic Vendors

Reviewer: Dr. Ronald H. Gore

Date: 10 April, 1997

Vendor Reviewed: Compliance Consultants, Inc.

Scoring Protocol

Range 0 to maximum, reviewers should use the full range for each evaluation. Too many zero or maximum scores (range manipulation by reviewer) may cause the review score to be adjusted to the mean of other reviewers. If several reviewers rank an item as 0 this may cause the proposal to be ranked as non-responsive.

INTRODUCTION (MAXIMUM AVAILABLE - 5)

- Company Background (2)
- Company's Remediation History (3)

SCORE: 5

KEY PERSONNEL - PRINCIPAL INVESTIGATOR/PROJECT MANAGER (MAXIMUM AVAILABLE - 35)

- Technology Experience (15)
- Education (5)
- Managerial Experience (10)
- Project Committed (5)

SCORE: 26

WORK PLAN OUTLINE (MAXIMUM AVAILABLE - 40)

- Provide Task Descriptions (10)
- Deployment of Personnel and Equipment (10)
- Operations (10)
- Project Team Description (10)
 - Technical Experience (5)
 - Education (5)

SCORE: 25

TECHNOLOGY/METHODOLOGY (MAXIMUM AVAILABLE - 75)

- Explain Kinetics Process (15)
- Research and Development Plan (15)
- Health and Safety Discussion (15)
- Discussion of Technology Interferences (30)
 - Saline Water Issues (10)
 - Sediment Porosity Issues (10)
 - Technical Efficiency (10)

SCORE: 55**SYSTEM DESCRIPTION (MAXIMUM AVAILABLE - 40)**

- Type of Electrodes/Electrode Management Scheme (10)
- Density and Distribution of Electrodes (10)
- System Additives: identification, advantages, and disadvantages, impacts, hazards, associated with additives (20)

SCORE: 34**UTILITY REQUIREMENTS (MAXIMUM AVAILABLE - 15)**

- Water Type and Quantity (5)
- Electrical Power (voltage, phase, voltage density, etc.) (5)
- Communications and Support Issues (5)

SCORE: 12**ON-SITE OPERATIONS (MAXIMUM AVAILABLE - 60)**

- Sampling Protocols (10)
- System Controls (10)
 - Emergency Shut-down (5)
 - Process Indicators/Controls (5)
- Maintenance Protocol/Technical Support (10)
- Waste Handling Storage and Disposal (10)
- System Shut-down, removal and site clean-up (10)
- Progress Reports (10)

SCORE: 52**SUMMARY SCORE (MAXIMUM TOTAL POINTS: 300)****TOTAL SCORE: 209**

Scoring and Ranking Form Electrokinetic Vendors

Reviewer: John C. Haley

Date: 10 April, 1997

Vendor Reviewed: Compliance Consultants, Inc.

Scoring Protocol

Range 0 to maximum, reviewers should use the full range for each evaluation. Too many zero or maximum scores (range manipulation by reviewer) may cause the review score to be adjusted to the mean of other reviewers. If several reviewers rank an item as 0 this may cause the proposal to be ranked as non-responsive.

INTRODUCTION (MAXIMUM AVAILABLE - 5)

- Company Background (2)
- Company's Remediation History (3)

SCORE: 3

KEY PERSONNEL - PRINCIPAL INVESTIGATOR/PROJECT MANAGER (MAXIMUM AVAILABLE - 35)

- Technology Experience (15)
- Education (5)
- Managerial Experience (10)
- Project Committed (5)

SCORE: 16

WORK PLAN OUTLINE (MAXIMUM AVAILABLE - 40)

- Provide Task Descriptions (10)
- Deployment of Personnel and Equipment (10)
- Operations (10)
- Project Team Description (10)
 - Technical Experience (5)
 - Education (5)

SCORE: 15

TECHNOLOGY/METHODOLOGY (MAXIMUM AVAILABLE - 75)

- Explain Kinetics Process (15)
- Research and Development Plan (15)
- Health and Safety Discussion (15)
- Discussion of Technology Interferences (30)
 - Saline Water Issues (10)
 - Sediment Porosity Issues (10)
 - Technical Efficiency (10)

SCORE: 20**SYSTEM DESCRIPTION (MAXIMUM AVAILABLE - 40)**

- Type of Electrodes/Electrode Management Scheme (10)
- Density and Distribution of Electrodes (10)
- System Additives: identification, advantages, and disadvantages, impacts, hazards, associated with additives (20)

SCORE: 17**UTILITY REQUIREMENTS (MAXIMUM AVAILABLE - 15)**

- Water Type and Quantity (5)
- Electrical Power (voltage, phase, voltage density, etc.) (5)
- Communications and Support Issues (5)

SCORE: 13**ON-SITE OPERATIONS (MAXIMUM AVAILABLE - 60)**

- Sampling Protocols (10)
- System Controls (10)
 - Emergency Shut-down (5)
 - Process Indicators/Controls (5)
- Maintenance Protocol/Technical Support (10)
- Waste Handling Storage and Disposal (10)
- System Shut-down, removal and site clean-up (10)
- Progress Reports (10)

SCORE: 33**SUMMARY SCORE (MAXIMUM TOTAL POINTS: 300)****TOTAL SCORE: 117**

Scoring and Ranking Form Electrokinetic Vendors

Reviewer: Dr. Boyd T. Riley

Date: 10 April, 1997

Vendor Reviewed: Compliance Consultants, Inc.

Scoring Protocol

Range 0 to maximum, reviewers should use the full range for each evaluation. Too many zero or maximum scores (range manipulation by reviewer) may cause the review score to be adjusted to the mean of other reviewers. If several reviewers rank an item as 0 this may cause the proposal to be ranked as non-responsive.

INTRODUCTION (MAXIMUM AVAILABLE - 5)

- Company Background (2)
- Company's Remediation History (3)

SCORE: 5

KEY PERSONNEL - PRINCIPAL INVESTIGATOR/PROJECT MANAGER (MAXIMUM AVAILABLE - 35)

- Technology Experience (15)
- Education (5)
- Managerial Experience (10)
- Project Committed (5)

SCORE: 20

WORK PLAN OUTLINE (MAXIMUM AVAILABLE - 40)

- Provide Task Descriptions (10)
- Deployment of Personnel and Equipment (10)
- Operations (10)
- Project Team Description (10)
 - Technical Experience (5)
 - Education (5)

SCORE: 20

TECHNOLOGY/METHODOLOGY (MAXIMUM AVAILABLE - 75)

- Explain Kinetics Process (15)
- Research and Development Plan (15)
- Health and Safety Discussion (15)
- Discussion of Technology Interferences (30)
 - Saline Water Issues (10)
 - Sediment Porosity Issues (10)
 - Technical Efficiency (10)

SCORE: 50**SYSTEM DESCRIPTION (MAXIMUM AVAILABLE - 40)**

- Type of Electrodes/Electrode Management Scheme (10)
- Density and Distribution of Electrodes (10)
- System Additives: identification, advantages, and disadvantages, impacts, hazards, associated with additives (20)

SCORE: 20**UTILITY REQUIREMENTS (MAXIMUM AVAILABLE - 15)**

- Water Type and Quantity (5)
- Electrical Power (voltage, phase, voltage density, etc.) (5)
- Communications and Support Issues (5)

SCORE: 15**ON-SITE OPERATIONS (MAXIMUM AVAILABLE - 60)**

- Sampling Protocols (10)
- System Controls (10)
 - Emergency Shut-down (5)
 - Process Indicators/Controls (5)
- Maintenance Protocol/Technical Support (10)
- Waste Handling Storage and Disposal (10)
- System Shut-down, removal and site clean-up (10)
- Progress Reports (10)

SCORE: 30**SUMMARY SCORE (MAXIMUM TOTAL POINTS: 300)****TOTAL SCORE: 160**

Scoring and Ranking Form Electrokinetic Vendors

Reviewer: Dr. Ronald H. Gore

Date: 12 April, 1997

Vendor Reviewed: Electrokinetics, Inc.

Scoring Protocol

Range 0 to maximum, reviewers should use the full range for each evaluation. Too many zero or maximum scores (range manipulation by reviewer) may cause the review score to be adjusted to the mean of other reviewers. If several reviewers rank an item as 0 this may cause the proposal to be ranked as non-responsive.

INTRODUCTION (MAXIMUM AVAILABLE - 5)

- Company Background (2)
- Company's Remediation History (3)

SCORE: 5

KEY PERSONNEL - PRINCIPAL INVESTIGATOR/PROJECT MANAGER (MAXIMUM AVAILABLE - 35)

- Technology Experience (15)
- Education (5)
- Managerial Experience (10)
- Project Committed (5)

SCORE: 30

WORK PLAN OUTLINE (MAXIMUM AVAILABLE - 40)

- Provide Task Descriptions (10)
- Deployment of Personnel and Equipment (10)
- Operations (10)
- Project Team Description (10)
 - Technical Experience (5)
 - Education (5)

SCORE: 36

TECHNOLOGY/METHODOLOGY (MAXIMUM AVAILABLE - 75)

- Explain Kinetics Process (15)
- Research and Development Plan (15)
- Health and Safety Discussion (15)
- Discussion of Technology Interferences (30)
 - Saline Water Issues (10)
 - Sediment Porosity Issues (10)
 - Technical Efficiency (10)

SCORE: 59**SYSTEM DESCRIPTION (MAXIMUM AVAILABLE - 40)**

- Type of Electrodes/Electrode Management Scheme (10)
- Density and Distribution of Electrodes (10)
- System Additives: identification, advantages, and disadvantages, impacts, hazards, associated with additives (20)

SCORE: 36**UTILITY REQUIREMENTS (MAXIMUM AVAILABLE - 15)**

- Water Type and Quantity (5)
- Electrical Power (voltage, phase, voltage density, etc.) (5)
- Communications and Support Issues (5)

SCORE: 13**ON-SITE OPERATIONS (MAXIMUM AVAILABLE - 60)**

- Sampling Protocols (10)
- System Controls (10)
 - Emergency Shut-down (5)
 - Process Indicators/Controls (5)
- Maintenance Protocol/Technical Support (10)
- Waste Handling Storage and Disposal (10)
- System Shut-down, removal and site clean-up (10)
- Progress Reports (10)

SCORE: 53**SUMMARY SCORE (MAXIMUM TOTAL POINTS: 300)****TOTAL SCORE: 232**

Scoring and Ranking Form Electrokinetic Vendors

Reviewer: John C. Haley

Date: 12 April, 1997

Vendor Reviewed: Electrokinetics, Inc.

Scoring Protocol

Range 0 to maximum, reviewers should use the full range for each evaluation. Too many zero or maximum scores (range manipulation by reviewer) may cause the review score to be adjusted to the mean of other reviewers. If several reviewers rank an item as 0 this may cause the proposal to be ranked as non-responsive.

INTRODUCTION (MAXIMUM AVAILABLE - 5)

- Company Background (2)
- Company's Remediation History (3)

SCORE: 4

KEY PERSONNEL - PRINCIPAL INVESTIGATOR/PROJECT MANAGER (MAXIMUM AVAILABLE - 35)

- Technology Experience (15)
- Education (5)
- Managerial Experience (10)
- Project Committed (5)

SCORE: 28

WORK PLAN OUTLINE (MAXIMUM AVAILABLE - 40)

- Provide Task Descriptions (10)
- Deployment of Personnel and Equipment (10)
- Operations (10)
- Project Team Description (10)
 - Technical Experience (5)
 - Education (5)

SCORE: 29

TECHNOLOGY/METHODOLOGY (MAXIMUM AVAILABLE - 75)

- Explain Kinetics Process (15)
- Research and Development Plan (15)
- Health and Safety Discussion (15)
- Discussion of Technology Interferences (30)
 - Saline Water Issues (10)
 - Sediment Porosity Issues (10)
 - Technical Efficiency (10)

SCORE: 49**SYSTEM DESCRIPTION (MAXIMUM AVAILABLE - 40)**

- Type of Electrodes/Electrode Management Scheme (10)
- Density and Distribution of Electrodes (10)
- System Additives: identification, advantages, and disadvantages, impacts, hazards, associated with additives (20)

SCORE: 27**UTILITY REQUIREMENTS (MAXIMUM AVAILABLE - 15)**

- Water Type and Quantity (5)
- Electrical Power (voltage, phase, voltage density, etc.) (5)
- Communications and Support Issues (5)

SCORE: 14**ON-SITE OPERATIONS (MAXIMUM AVAILABLE - 60)**

- Sampling Protocols (10)
- System Controls (10)
 - Emergency Shut-down (5)
 - Process Indicators/Controls (5)
- Maintenance Protocol/Technical Support (10)
- Waste Handling Storage and Disposal (10)
- System Shut-down, removal and site clean-up (10)
- Progress Reports (10)

SCORE: 30**SUMMARY SCORE (MAXIMUM TOTAL POINTS: 300)****TOTAL SCORE: 181**

Scoring and Ranking Form Electrokinetic Vendors

Reviewer: Dr. Boyd T. Riley

Date: 12 April, 1997

Vendor Reviewed: Parsons/Electrokinetics, Inc.

Scoring Protocol

Range 0 to maximum, reviewers should use the full range for each evaluation. Too many zero or maximum scores (range manipulation by reviewer) may cause the review score to be adjusted to the mean of other reviewers. If several reviewers rank an item as 0 this may cause the proposal to be ranked as non-responsive.

INTRODUCTION (MAXIMUM AVAILABLE - 5)

- Company Background (2)
- Company's Remediation History (3)

SCORE: 5

KEY PERSONNEL - PRINCIPAL INVESTIGATOR/PROJECT MANAGER (MAXIMUM AVAILABLE - 35)

- Technology Experience (15)
- Education (5)
- Managerial Experience (10)
- Project Committed (5)

SCORE: 25

WORK PLAN OUTLINE (MAXIMUM AVAILABLE - 40)

- Provide Task Descriptions (10)
- Deployment of Personnel and Equipment (10)
- Operations (10)
- Project Team Description (10)
 - Technical Experience (5)
 - Education (5)

SCORE: 20

TECHNOLOGY/METHODOLOGY (MAXIMUM AVAILABLE - 75)

- Explain Kinetics Process (15)
- Research and Development Plan (15)
- Health and Safety Discussion (15)
- Discussion of Technology Interferences (30)
 - Saline Water Issues (10)
 - Sediment Porosity Issues (10)
 - Technical Efficiency (10)

SCORE: 40**SYSTEM DESCRIPTION (MAXIMUM AVAILABLE - 40)**

- Type of Electrodes/Electrode Management Scheme (10)
- Density and Distribution of Electrodes (10)
- System Additives: identification, advantages, and disadvantages, impacts, hazards, associated with additives (20)

SCORE: 25**UTILITY REQUIREMENTS (MAXIMUM AVAILABLE - 15)**

- Water Type and Quantity (5)
- Electrical Power (voltage, phase, voltage density, etc.) (5)
- Communications and Support Issues (5)

SCORE: 15**ON-SITE OPERATIONS (MAXIMUM AVAILABLE - 60)**

- Sampling Protocols (10)
- System Controls (10)
 - Emergency Shut-down (5)
 - Process Indicators/Controls (5)
- Maintenance Protocol/Technical Support (10)
- Waste Handling Storage and Disposal (10)
- System Shut-down, removal and site clean-up (10)
- Progress Reports (10)

SCORE: 50**SUMMARY SCORE (MAXIMUM TOTAL POINTS: 300)****TOTAL SCORE: 180**